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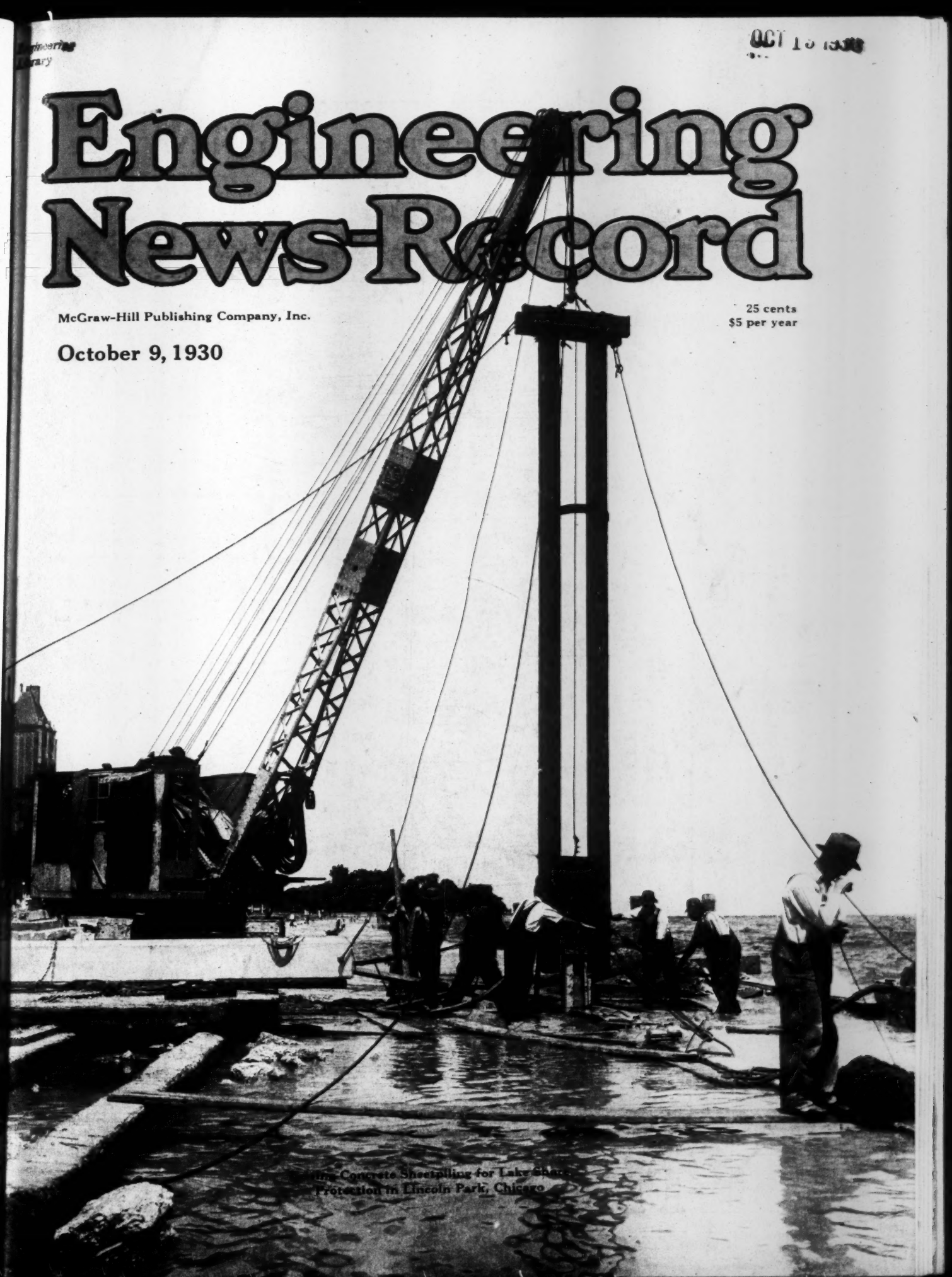

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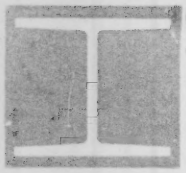

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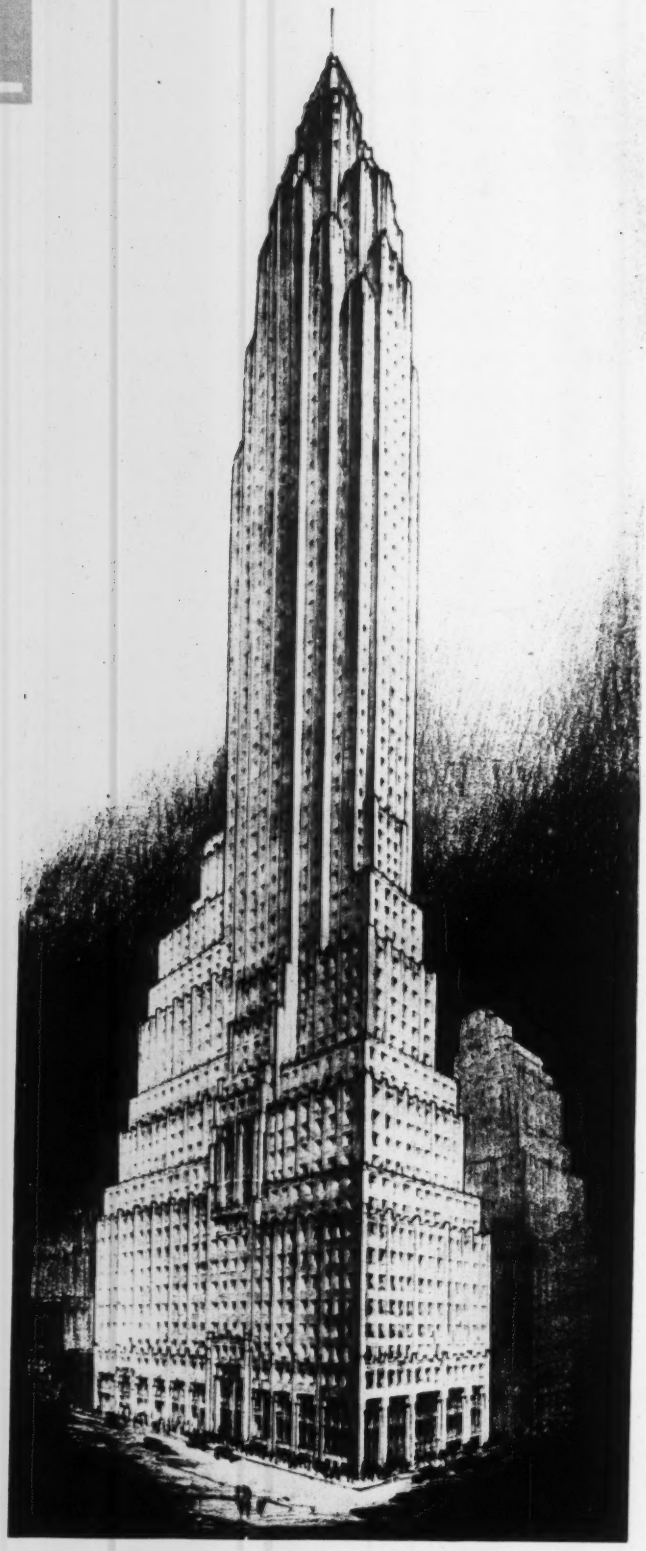

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ENGINEERING NEWS-RECORD

A Consolidation of Engineering News, Engineering Record, The Sanitary Engineer, and The Contractor

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McGRAW-HILL PUBLISHING COMPANY, INC., Tenth Ave. at 36th St., NEW YORK, N. Y.

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CABLE ADDRESS: "MACHINIST, N. Y."

Published weekly. $5 per year. 25 cents per copy. Entered as second-class matter April 11, 1917, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

Member A.B.C.
Member A.B.P.

NUMBER OF COPIES PRINTED THIS ISSUE, 30,486

NEW YORK District Office, 285 Madison Avenue
WASHINGTON, National Press Building
CHICAGO, 520 N. Michigan Avenue
PHILADELPHIA, 1600 Arch Street
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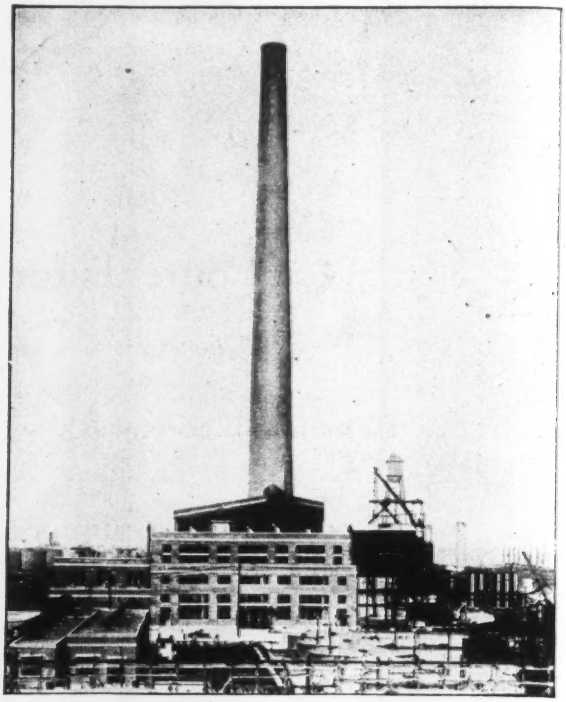

New power plant *at Port Arthur* for Gulf Refining Company

Utilizes refinery waste products—operates at high efficiency—built in 6 months

WHEN the Gulf Refining Company called us in to design and build a new power plant at Port Arthur we were instructed to complete the work at the earliest moment possible.

Three weeks after the contract was signed—as soon as foundation plans were approved—our field forces began construction. And in six months the plant delivered process steam to the refinery —well within the time provided by our fast schedule and well within the estimated cost.

The plant was designed so that as much power as possible could be generated from steam going to process, resulting in economical production of both power and steam.

The furnaces are designed to utilize refinery waste products — pulverized paraffin coke and sludge oil—and are equipped with air heaters to give high efficiency.

There are three boilers, each of 15,400 sq. ft. of heating surface, generating steam at 535 lbs. and 150° superheat.

One 10,000 kw. turbo-generator is installed, with a throttle pressure of 500 lbs. and exhausting at 150 lbs.

While the work was progressing at Port Arthur, we were building for this client a large bulk storage plant on Staten Island, N. Y., which was also completed in six months. And two months after we had completed the plant we were called back to build other large extensions.

All the work was done in cooperation with the Construction Division of the Manufacturing Department of the Gulf Refining Company.

Our services are available for the design and construction of power plants, refineries, booster plants, bulk storage plants, pipe lines and industrial work of any nature.

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A McGRAW-HILL PUBLICATION — ESTABLISHED 1874

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F. E. SCHMITT, *Editor*

Volume 105 NEW YORK, OCTOBER 9, 1930 Number 15

Gambling Against Odds

"STARTING by spontaneous combustion in waste material, the flames consumed 100,000 ft. of scaffolding and . . . caused damage variously estimated at from $700,000 to $1,000,000." There is a familiar ring to this quotation from an Associated Press report describing a fire in the nearly completed State Education Building at Harrisburg, Pa. In it we read many usual features of a construction fire: accumulation of waste material; inflammable scaffolding; the self-evident lack of extinguishing equipment. Despite the emphasis which has been placed upon fire prevention in the past few years, the construction job which systematically and deliberately guards against the conflagration hazard is a rarity. It is time that such carelessness were ended. The cost of precautionary measures is slight, and the losses from a single blaze may be tremendous. To gamble against these odds is not the way of wisdom.

Power Right Values

THE ENERGY which resides in falling water is not a property right, according to a recent decision of the Wisconsin railroad commission. By Wisconsin law the commission is required to set a value upon the dam site and flowage rights before it grants a power development permit, a value which the power company must accept for the site and flowage rights if at the end of 30 years the state or a municipality wishes to purchase the development. In valuations of this kind, the commission heretofore has always included some value for the power available at the site, although the amount has decreased in recent years. Now it sets up a wholly new, and highly important, theory which departs from its past practice. The commission's action marks another step in the movement to put an end to the speculative exploitation of natural resources for private gain. Few will question the justice of paying a public utility a fair interest upon its investment in land and buildings, but an increasing number of people believe that it should not be paid a return upon rights which it acquires without cost from the state. The valuation requirements written into Wisconsin's law were an early attempt to check the exploitation of these rights; the commission's new interpretation of the law attempts to end it entirely so far as Wisconsin is concerned.

The Arch Is Closed

IT IS with a feeling of relief that engineers will read of the successful closing of the 1,652-ft. Kill van Kull arch at New York last Saturday. This record-making structure, while the brain child and product of a small group of engineers, was in the broader sense sponsored by the entire civil engineering profession. Failure to make the closure successfully would have been a disaster which every engineer would have had to share. Conversely the completion of the arch brings honor to the profession as well as to the designers and erectors. The success of few great engineering structures hinges so completely on a single erection operation as does that of a steel arch. Just before the lowering commences the two halves of the steel skeleton point upward and outward toward each other, apparently complete, massive, and seemingly a permanent part of the landscape, yet in truth notably unstable and uncertain in behavior until the ends finally come to rest on the closing pin. The erection expedients adopted for effecting this closure are untried, and cannot have been tested until the crucial moment arrives. Regardless of theoretical considerations which point to success, final closure alone permits the erector any feeling of elation. Few large arches have behaved so perfectly during closing as this one, whose span exceeds that of the famous Hell Gate structure by nearly 700 ft. Jack movements were translated into chord movements with unfailing accuracy. Completion of the bridge is now a routine matter. A great job done, the engineering world can turn its attention to other problems yet unsolved, with increased confidence.

To Falter or Fulfill

THE tragedy which overtook the "R-101," pride of the British Air Ministry, at the very start of its ambitious flight from England to India, is still too vivid in its tragic human aspect to weigh the causes of the disaster or its probable effect on rigid airship design. Yet a thorough, dispassionate examination is an immediate necessity of first magnitude. Any temporizing or faltering in this regard would be breaking faith with the gallant men who perished, not one of whom, from the Air Minister down to the galley boy, but would want the disaster considered in any way except as a full-scale laboratory experiment. The "R-101" was believed to be an epoch-making ship whose design had taken advantage of every scientific discovery developed since disaster befell the British-built "R-38," the Zeppelin "Shenandoah" and the Italian ships "Roma" and "Italia." It utilized pin joints exclusively to avoid secondary stresses. It benefited from design methods believed to minimize the effect of the many necessary redundant members. Its transverse frames were designed as triangular braced structures instead of as simple ring girders with radial and chordal wiring for bracing. Other radical innovations were incorporated—a length to greatest diameter ratio of only 5.5 to 1, longitudinal girders and ridge girders of light alloy steel combined with duralumin struts, complete elimination of the longitudinal stiffening member known as the keel in other ships, a continuous-curve envelope from stem to stern, and fuel oil engines with small gasoline auxiliaries. All these changes from past practice require analysis in the light of the probable forces set up in the storm which forced the ship down. Lessons from the "R-101" disaster must be utilized to the utmost if rigid airships are

to realize those advantages forecast by the remarkably successful flights of the "Graf Zeppelin." To falter or fulfill are the alternatives. There must be no faltering now simply because of the magnitude of the disaster.

Theme Programs

UNUSUAL success attended the efforts of the St. Louis program makers of the American Society of Civil Engineers. They arranged a theme program, the papers and discussions centering on a local subject. Co-operation of the local committee with the society officials provided the means of bringing this about without developing differences and antagonisms. The central theme was large city problems, a theme highly appropriate for St. Louis, where a forward-looking program has not only been formulated but in large part actually budgeted by bond issues. Under these circumstances the papers and discussions of the general sessions worked out effectively. The highway division stuck to its theme for this year, that of prequalification of contractors, and the construction division held to foundations. There are still too many division programs run simultaneously, but this can perhaps be remedied by an elaboration of the tacit understanding between the structural and construction divisions wherein they choose subjects common to both and then alternate their meetings. The highway and planning divisions might well take up such a subject as ten-year county highway programs. Discussions were all pre-stimulated and had few of the earmarks of spontaneity. Strict adherence to time schedules might well be modified sufficiently to give the chairman time to introduce speakers and give some continuity of thought to the program; otherwise the machinery of the program was well covered with naturalness and sustained interest.

Two Costly Terminals

COST runs high in modern railroad passenger terminals for large cities. That fact was the subject of comment in these pages some weeks ago following the opening of the new Cleveland terminal. It comes to the fore again in any consideration of the partly completed Pennsylvania Railroad terminal at Philadelphia and the projected Canadian National Railways terminal in Montreal. A hundred million dollars is being spent at Philadelphia and fifty millions at Montreal. In both cities the terminals involve expenditures beyond those required simply for modernization of existing facilities. Therein they illustrate how outside influences often add greatly to terminal costs.

In Philadelphia the plan calls for moving the main Pennsylvania Railroad station out of the center of the city to a site on the west bank of the Schuylkill River to free a large section of the blight which the old railway terminal cast upon it. Obviously, the new terminal is designed to produce many operating economies, but they must fall far short of paying interest on the entire investment involved in moving the terminal. Much of the cost will have to be charged off to maintenance of good will and satisfying the demands of civic pride.

In Montreal the engineers of the Canadian National Railways are faced with the problem of co-ordinating the scattered terminals of the several railways that now make up the national system, as well as with the problem of modernization. But there, as well as at Philadelphia, modernization could be accomplished without some of the projected expenditures, possibly at some sacrifice of efficiency. Modernization of the existing passenger station rather than the construction of a new one on a different site was one of the proposals made by W. C. Lancaster in his recent report on the terminal situation there. However, the Canadian National Railways is government owned and competes with the privately owned Canadian Pacific Railway with its modern stations. At present the Canadian National's main station is inferior in character and in its site to that of the Canadian Pacific. Both national and local pride demands that the new government-owned terminal be at least on a par with the Canadian Pacific terminal in the nation's largest city.

Both Philadelphia and Montreal are examples of how high costs may run. As individual instances they may not be matters of public concern, but in the aggregate the country over the cost of new passenger terminals mounts up to such an enormous figure that its effect upon railroad finances becomes a serious matter. Is it not time that such projected expenditures in this country be subjected to impartial review by the Interstate Commerce Commission before they are approved? Viewed dispassionately, it might be difficult to justify some of the expenditures railroads are called upon to make.

Conflicts to Be Adjusted

AN ATTEMPT to seek out and remove the sources of irritation between the architectural and engineering professions is under way. Informal discussions between representatives of the American Institute of Architects and the four founder engineering societies have led to the decision to organize a joint committee of four architects and four engineers to take up the subjects of controversy and make recommendations as to means of rectifying them.

The joint committee is to approach its task as a national rather than as a local undertaking. Its findings cannot be made binding upon local or state organizations. Nevertheless, as most local difficulties find their origin in misconceptions or attitudes of mind which are of national character, much help in local matters may be expected from sound findings on national matters.

Among the subjects of controversy which developed during the past year in the controversy between engineers and architects in New York State are several which have a national aspect. Chief among them is the opinion—as expressed by one of the national directors of the American Institute of Architects—that an architect who is not technically qualified to design structural or mechanical details of a building can be counted upon to employ a structural or mechanical engineer for that work, but that an engineer cannot be similarly relied upon. In the specific instance cited it was held that a chemical engineer cannot safely be called in to act as the principal agent for an owner planning to put up a new plant.

Those architects who hold this view justify it by claiming that an architect alone is qualified by his training to appreciate all the various services required to make a complete building, not only in its structural and esthetic aspects but also in the arrangement of floor space and service facilities. They hold that engineers are not so qualified, that they might through ignorance undertake work for which they are not qualified.

Engineers, on the other hand, claim that the ability to determine what expert services are required in a building operation and that to co-ordinate the services of these

experts is not peculiar to architects nor is it an ability which is developed by any course of training which architects alone take. Further, they see in this an implication that the professional and ethical standards of engineers are lower than those of architects.

The second major subject of controversy is closely related to the first. An attempt has been made to divide all building work into two classes and to provide by law that one class is the exclusive field of architects and the other the exclusive field of engineers, or, as was proposed in New York State this year, to leave the second class open to both architects and engineers. Here, as before, the matter hinges upon whether one profession possesses a peculiar fitness for such work not possessed by the other. Again, the architects claim that their special ability in planning floor layouts and space arrangements and in specifying required facilities in office buildings, hotels and apartment houses makes it essential that they act as principal agents for the owners on such work. To this the engineers reply that, even granting that architects are better trained in the arrangement of floor spaces and facilities, there is no sound reason why an engineer should not act as the owner's principal agent, employing architects for that work just as architects employ engineers to design the structural framework, mechanical and electrical equipment of many large buildings. Further, they declare that as public safety is not involved in floor layouts except possibly in the matter of exit and fire towers—matters which are clearly specified in building codes understandable alike by engineers and architects—it is a perversion of the state police power to attempt to exclude engineers from such work by law.

A third source of trouble centers in the ability of engineers and architects to design buildings which are structurally safe. The architectural profession points out that all architects have a sufficient grounding in the principles of structural engineering to judge whether plans prepared by them or under their direction are structurally sound. They decline, however, to concede similar blanket qualifications to engineers, maintaining that only structural engineers (or possibly civil engineers) should be permitted to certify to the structural sufficiency of building plans. In this latter opinion they find much support among engineers, many of whom feel that it would be better to limit the filing of the plans for all except small buildings to engineers with special training in structural design. However, they maintain that the same limitation should be placed upon architects; that the architect whose chief interests are in the artistic side of his professional work and who knows little and cares less about the routine work of structural design should be put in the same class as engineers of limited structural knowledge.

These are the major subjects of controversy; the others are of less fundamental importance but are nevertheless sources of friction. One is the wording of the uniform registration law for engineers. As now written, the section concerning public works may be read as requiring that all public works be carried on under the direction of engineers. The American Institute of Architects has gone on record as seeing in this an intentional attempt to exclude architects from public works such as school and state hospital construction. Engineers who were active in the preparation of the law deny having any such ulterior purpose. Public works were specifically mentioned by them in order to make it clear that state officials in charge of such work must be subject to the restrictions of license laws.

Another source of difficulty found in the uniform registration law, as well as in many state registration laws, is a lack of definite educational requirement. Architects object to having engineers placed on an equal status with them so long as their educational requirements appear to be lower than those of the architectural profession. Engineers object to the false-front definition of architectural qualifications written into the architectural qualification law but not realized in practice.

New York State's multiple dwelling law with its requirement that certification as to the sufficiency of plans for multiple dwellings be limited to "the owner or a registered architect" is another local matter which has become an important source of interprofessional conflict. Arguments pro and con are similar to those used by the two professions in the matter of dividing all building work into two classes. Engineers find this particular provision of the law particularly objectionable because they believe it to be legislation which was purposely put over by a small group of architects to gain an advantage for their profession which could not have been obtained had the matter been frankly put up to the engineering profession when the law was passed.

All these matters and possibly others are subjects which will come up before the joint committee for action. Viewed narrowly from a selfish professional viewpoint the problems are difficult to solve, if not entirely beyond solution. But viewed broadly, solutions are not difficult to find. There is every indication that men of broad decision will sit on the joint committee. Consequently we have little hesitancy in saying that we look for proposals from the committee which if put into effect will clear up most of the present troubles that are causing concern to members of both professions.

Replanning Cities

THE STORY of the town is at an end. The city of the future will be a new form of unit, for a revamping and rebuilding of our cities is going on at a tremendous rate. The work not only absorbs the civil engineer's talent and taxes his ingenuity but it broadens his field of activity far more than most engineers realize. Centralization, decentralization, regional urbanization, a back-to-the-country movement without entire divorce from all the amenities of urban life are among the present trends that compel thought. It is the engineer who is primarily concerned with carrying out these complex and costly movements.

Much attention was directed to this situation last week at the St. Louis meeting of the American Society of Civil Engineers. W. W. Horner, in an opening paper, outlined many future possibilities. He argued that centralization is entering such a serious phase as to presage many unthought of problems. For instance, there is no reason why such a business as insurance should occupy a 30-story building in the heart of a congested district; far better locate it in the outskirts in the center of a ten-acre park. A small group of executives might still retain offices in the city center, but the army of clerks and sub-executives need not clutter up street and transportation facilities already taxed to the limit. Surely engineers have still many problems on which to work in realigning old railroads and highways long after all the new ones are located. Even more intricate is the revamping, replanning and rebuilding of urban engineering structures and utilities.

Active Work Begins on Large Railway Terminal at Montreal

Government-Owned Canadian National Railways To Build New Passenger Terminal in Heart of City—Scattered Terminals To Be Connected by New Railway Lines in Outlying Sections—Freight Movement To Be Facilitated

CONSTRUCTION work has begun on a $50,000,000 terminal project for the Canadian National Railways (government owned) at Montreal, following the granting of formal approval of the general scheme by the city authorities. Approval of certain details, which is withheld pending further negotiations between the city and railway authorities, will not hold up work on the major parts of the undertaking.

History—Plans for co-ordinating the disconnected terminal facilities of the several railways entering Montreal, which now are part of the Canadian National Railways system, have been under consideration for several years past. In June, 1929, following a favorable report upon the railroad company's plans by Sir Frederick Palmer, of London, the dominion government gave its approval by a special act of parliament and provided $50,000,000 for construction. It was anticipated then that the work would take about five years and that annual installments of approximately $10,000,000 would be required to finance the work. Nothing then appeared to stand in the way of an early start on the work, as during the long period spent in obtaining approval of the project the railway company had gone ahead with the purchase of land and buildings needed for the terminal and had demolished many of the buildings which would have to come down regardless of the details of the final plan.

Approval of the project in general had been expressed by the city government and by local civic bodies while it was under consideration by parliament, but this spring, following a change in the city government, the mayor asked the railway company to hold up work until the executive council could have a report made upon the project. Dissatisfaction with the plan in the St. Henri district of the city, where grade separation is to be obtained by track elevation under the approved plan, was given as the reason for the mayor's request. The railroad officials agreed to hold up work until August, and William C. Lancaster, chief engineer of the transit commission, New York, was engaged by the city to review and report upon the plan.

The Lancaster report was submitted to the city council late in August. It called not only for the depressed tracks desired in the St. Henri district but also for an entire revamping of other major features of the project, chiefly abandonment of the large passenger terminal in the heart of the shopping and theater district, which is the central feature of the approved plan. Immediately

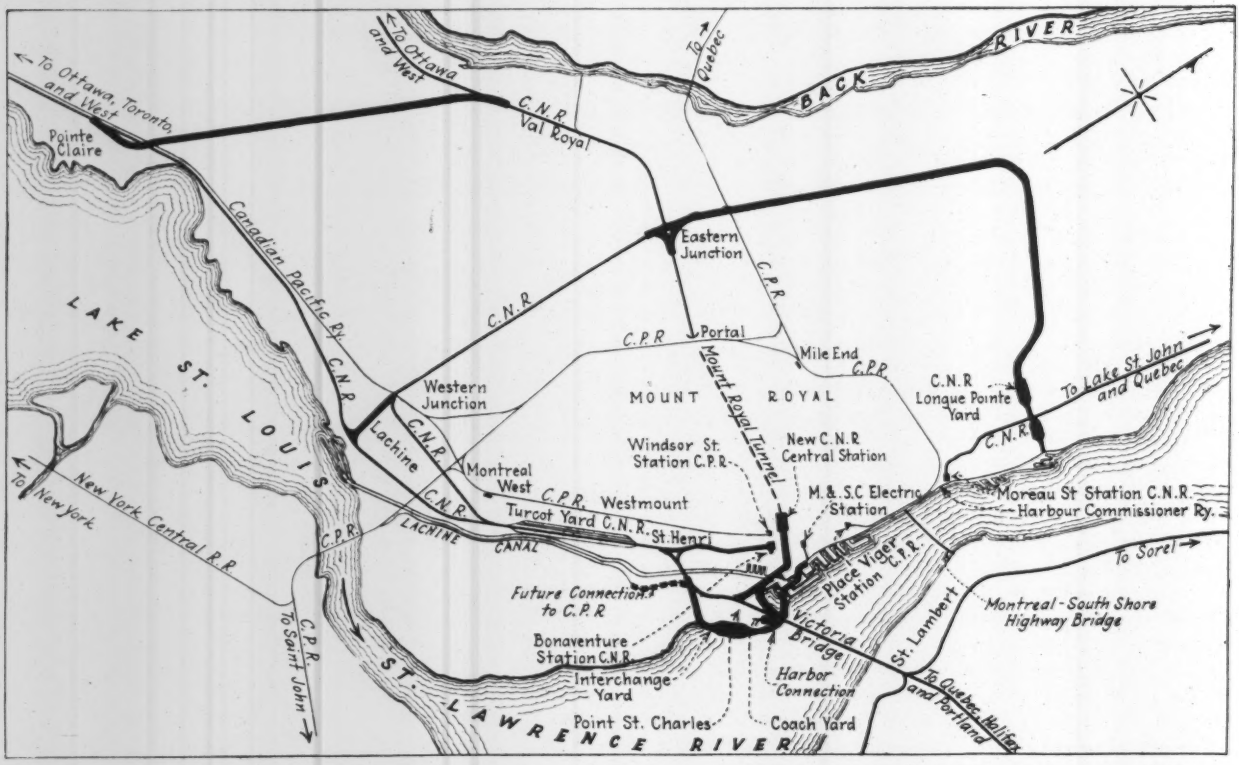


FIG. 1—RAILWAY LINES AT MONTREAL SHOWING PROJECTED CHANGES IN CANADIAN NATIONAL RAILWAYS
New tracks and yards are shown as heavy lines

FIG. 2—PROJECTED NEW PASSENGER STATION IN MONTREAL

Proposed new passenger station and tower office building sketched on an airplane view of Montreal. None of the buildings shown beyond the office building and adjoining the viaduct is contemplated in the present work. The St. Lawrence River and Victoria Bridge are shown in the distance. In the right foreground is the new Sun Life Building, now under construction.

upon publication of the plan much objection was raised to it, chiefly because it would mean delay in the start of work in a time of unemployment. As a result, the city council decided not to press consideration of the Lancaster plan and so gave its approval to the existing plan. However, the council reserved the right to further negotiations with the railway company regarding the depression of the tracks in the St. Henri district and in the northern side of the city.

Railways Entering Montreal—A railway map of Montreal, together with the projected new railway lines, is shown in Fig. 1. The city of Montreal occupies the eastern slope of Mount Royal and the lowlands along the Lachine Canal and the St. Lawrence River. Suburban sections lie to the northeast and southwest of the mountain and around on its westerly side. The main line of the Canadian Pacific Railway comes into the city to Windsor station, a stub-end terminal close to the hotel and shopping district, over tracks which follow the edge of the slope which separates the residential and shopping districts of the city from the lower section along the river. The tracks are so located that streets may be depressed to pass under them with a minimum of inconvenience. The Canadian Pacific also has a station in the northern section of the city for its Quebec line.

The old Grand Trunk Railway, now a part of the Canadian National system, came into the city from the west along the river close to the Lachine Canal to Bonaventure station on the lowlands a few blocks below Windsor station. Bonaventure is still the main station of the Canadian National system. It is old and out of date and its track approaches are at street level through a congested section of the city. Trains from the Grand Trunk system to the south and east come into Bonaventure station over Victoria bridge. Another part of the present Canadian National system is the old Canadian Northern line serving the northern part of the province. Its station lies in the northern part of the city. There is no direct connection between this railway and the main line into Bonaventure station except over the track of the Harbour Commissioners Railway along the waterfront.

A third station of the present Canadian National system is the so-called tunnel station of the former Canadian Northern Railway, built by that railroad during its prosperous days before the war when it sought a station in the heart of the city. For that purpose it bought much of the land now to be used for the passenger station of the Canadian National system and built a two-track tunnel under Mount Royal to reach the site. War put a check upon the project and the small station then built is used now chiefly for suburban trains. The line is electrified out to Eastern Junction.

Terminal Reconstruction Plans—The present undertaking calls for the construction of a large new passenger terminal at the site of the former C.N.R. tunnel station, making it a through station by carrying the tracks on an elevated structure out from the tunnel portal across the lower part of the city to Victoria bridge; transformation of the Bonaventure station site into a modern freight station; and construction of connecting lines where needed to facilitate train movement between the several lines entering the city and to give direct access to the new passenger station. An office building over part of the passenger terminal to house all the widely scattered headquarters offices of the railroad company is included in the project.

Construction of the passenger terminal and the elevated railway connection to Victoria bridge is to be started immediately, as that work will require the greater

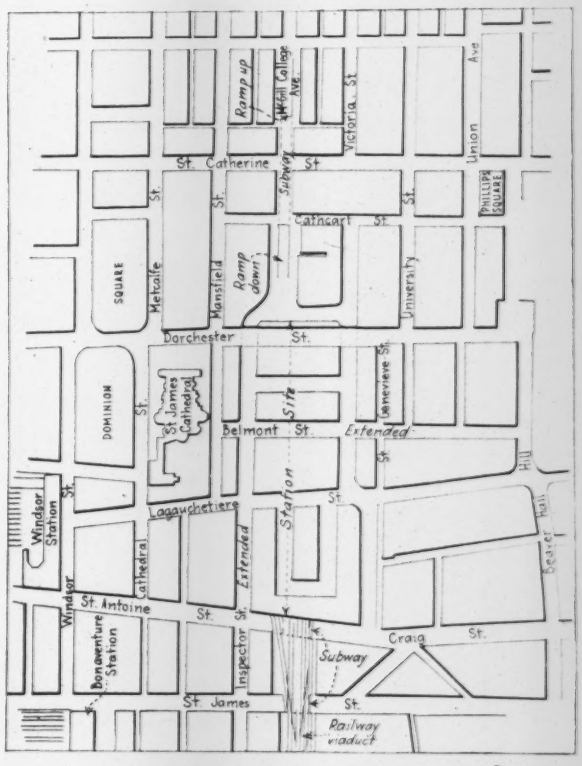


FIG. 3—CANADIAN NATIONAL RAILWAY TERMINAL SITE

The relation of the new terminal to the principal streets is shown, also projected street changes.

part of the construction period for its completion. Also, pushing the completion of the new passenger terminal while the Bonaventure station is kept in service will minimize the traffic interruption to construction work at the new terminal and subsequently will free work in the Bonaventure area of interruption due to traffic after the passenger traffic has been diverted to the new terminal. The only departure from this plan will be the immediate construction of the viaduct to carry Mountain and Guy streets over the Bonaventure yards in order to relieve street traffic congestion in that area.

The new passenger terminal will occupy a sloping site between Ste. Catherine St., the principal longitudinal street in the upper section of the city, and St. James St., the principal longitudinal street in the lower part of the city, the station proper being located about midway between the two streets with its main entrance through the office building facing on Dorchester St. (parallel to Ste. Catharine), which is carried over the station at El. 120. Rear entrances to the station will be from St. Antoine St., which will pass under the viaduct approach at El. 50. Tracks in the present tunnel station are at El. 70, and as that is approximately the same elevation as the tracks on Victoria bridge, the tracks in the new terminal and on the approach viaduct will be kept at that level.

Full advantage of the slope of the land is to be taken in the layout of the station. Baggage, mail and express facilities are to be located below the platform tracks at the level of St. Antoine St., with entrance and exit on that street, thus completely separating them from the passenger facilities. The platform tracks will all be at the next level above, with the suburban tracks segregated at one side. The train concourse is to be at a level above the platform tracks at right angles to the tracks and about over the center of the platforms. Taxicab service for arriving passengers will be at that level and cab service for departing passengers will be at the level above with access through the side street leading either to the upper or lower section of the city. To further facilitate approach to the station, McGill College Ave. is to be carried under Ste. Catherine St. into the terminal area. Foot-passengers coming to the station on the surface-car line on Ste. Catharine St. will enter from the upper level at Dorchester St.

For the present only the railway company's office building will be built above the terminal site, but the terminal structures are being designed so that the air rights over the full area may be developed at some future date.

Approach Viaduct—Between the passenger station and Victoria bridge the approach tracks are to be carried on a reinforced-concrete viaduct, all on a private right-of-way except at street crossings. In the business section of the city adjacent to the terminal, the viaduct is to be carried over buildings which may be used for storage, warehouse or garage purposes. The viaduct will have a solid deck for ballasted track. It will have a width sufficient for eight tracks with six tracks laid on it at the outset. Deep girders at the street crossings will minimize the noise of passing trains.

Car and locomotive service to the new station will be over the viaduct as the coach yard and engine houses will be located out in the present Point St. Charles yard near the western end of Victoria bridge.

Point St. Charles Yard—The present yard at Point St. Charles is to be enlarged by the addition of coach tracks and an interchange yard with the Harbour Commissioner's Railway which runs along the waterfront and serves the steamship docks, grain elevators and industries located there. Provision also will be made for a connection to the C.P.R. track in the Point St. Charles area so that the interchange yard may be used as a joint facility in the future, if found desirable.

From Point St. Charles to Turcot yard, the main-line tracks are to be elevated to provide for grade-crossing elimination. This work already is under way.

Bonaventure Freight Terminal—As soon as the Bonaventure station area is abandoned as a passenger terminal the site is to be taken for the construction of a freight terminal. Modern fruit-and-vegetable handling facilities are to be included.

Tracks in this new freight terminal will be at street grade with the two main cross streets carried over by viaduct, as noted previously. From the throat of the yard down through St. Henri to Turcot yard, the present plan calls for a double-track elevated structure, but, as noted heretofore, final decision as to whether these tracks are to be elevated or depressed is left for further negotiation between the city and the railway company. As the present street level is only

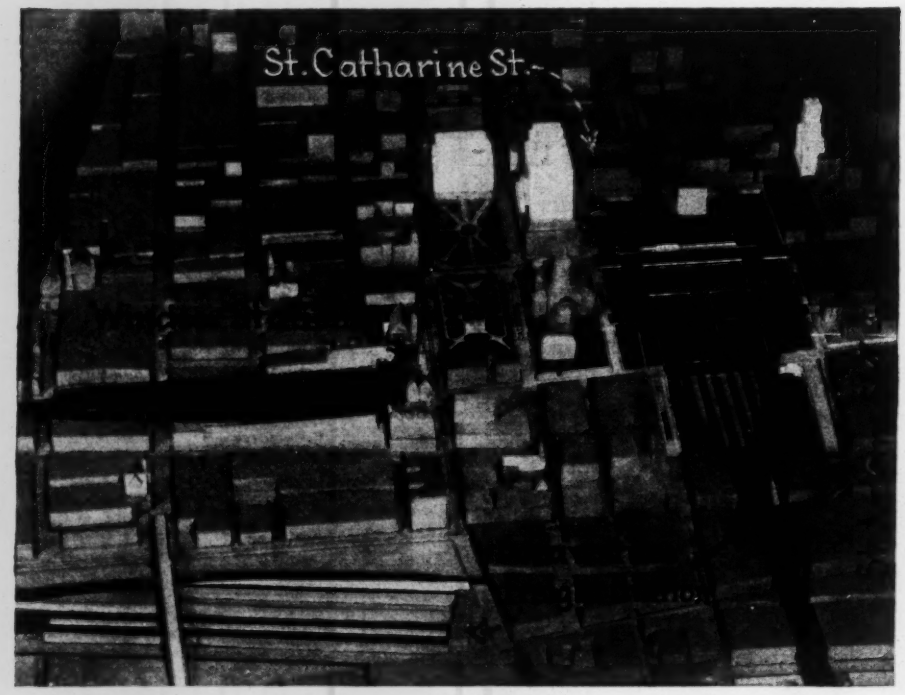


FIG. 4—MODEL OF THE PASSENGER TERMINAL SITE
This model shows approximately the area included in Fig. 3. The projected freight terminal on the Bonaventure station site is shown in the lower left corner. The location of a possible connection from the Bonaventure tracks to the passenger terminal also is indicated.

2 or 3 ft. above the level of the Lachine canal, and as much of the area is filled land, the railway company is strongly opposed to going to the expense of building and maintaining depressed tracks, especially as the neighborhood is largely industrial and appears destined to become entirely so.

Three connecting lines, shown in Fig. 1, are to be built to eliminate the long detours now required in moving freight around the city between Turcot yard and Longue Pointe yard, also to give direct access to the new passenger terminal for trains from the North and West. At Longue Pointe the present limited yard is to be expanded.

As the projected line from Longue Pointe around to Eastern Junction is partly through a rapidly developing suburban area, the question of its location above or below street level also is the subject of negotiation between the city and the railway company.

Electric operation is to be used between St. Lambert on the south side of the St. Lawrence River across Victoria bridge and through the passenger terminal and the tunnel to Eastern Junction.

The terminal work is being carried out under the direction of C. B. Brown, chief engineer, Canadian National Railways.

Pennsylvania Railroad Opens

New Suburban Terminal at Philadelphia

Underground Station North of Old Broad St. Station and an Elevated Station in West Philadelphia to Serve Suburban Trains Are First Units of Projected Replacement of Broad St. Station by a New Through Station West of the Schuylkill River in West Philadelphia

SUBURBAN traffic into Philadelphia over the Pennsylvania Railroad was transferred from the old Broad St. station to a new underground station at a site just north of the old station on Sept. 28 and at the same time a new suburban station at 30th St. in West Philadelphia was put into service.

With this change the old Broad St. station will cease to be used for terminal purposes except by main-line trains during the construction period. They will enter over temporary connections to the suburban station approach tracks, thus making possible the removal of the old Broad St. station approach tracks from the site of the new passenger terminal to be built west of the Schuylkill River.

The general arrangement of the Philadelphia terminals of the Pennsylvania Railroad after the present reconstruction work is completed is shown in Fig. 2. In the present layout, before reconstruction was begun, the several lines of the railroad converging in West Philadelphia crossed the river on three bridges about on the line of the projected Pennsylvania Boulevard bridge (as shown in Fig. 2) and approached the Broad St. station on a walled embankment known locally as the "Chinese Wall." Both main-line trains and suburban trains came into the Broad St. station by this route. In the new terminal only suburban trains will come into the center of the city. Main-line trains will be handled through the new passenger terminal now being built on the west bank

WEST END OF THE SUBURBAN STATION IN WEST PHILADELPHIA

This view, taken from the elevated line looking east across the river toward the center of the city, shows the platforms before the trainshed was completed. One of the tracks in the left foreground is temporarily depressed for connections required during the construction period.

of the Schuylkill River. The three old railway bridges across the river are to be removed, as is the "Chinese Wall." In their place there is to be opened a new wide street extending from City Hall across the river to the new station. It is to be known as Pennsylvania Boulevard. Tracks into the new suburban station in Philadelphia are carried over the river on a new monumental bridge of reinforced concrete and stone. A similar bridge is to be built for Pennsylvania Boulevard.

In the new layout in West Philadelphia the station tracks for main-line service will lie in a general north and south direction parallel to the river at the existing ground level, which is a few feet above river level. Above them in the station area will be the main concourse at the level of Market St. and at the upper level of the projected West River Drive. Suburban tracks converging on the station from the north, west and south will pass over the north end of the main concourse to reach the new bridge by which they enter Philadelphia. It is these suburban tracks, with their station facilities in West Philadelphia and Philadelphia, which are now in service.

The suburban station in West Philadelphia as it appeared early in September is shown in Figs. 2 and 3. The central portion of the station platform is to be entirely covered with an umbrella roof of glass and concrete tile, but for the present a vent is left open over the center of each track for the passage of steam locomotives passing through over the temporary track connections to the old Broad St. station.

Stairs and escalators lead from the suburban platforms down to a transverse suburban concourse of shallow depth above the main station concourse. All the ticket offices and other suburban station facilities are temporarily located near that concourse.

As a temporary arrangement, trains of the New York-Washington line soon will be run through the West Philadelphia terminal about on the line of 30th St. A temporary station to serve these trains has been constructed at the level of the main concourse under the suburban track in the area to be occupied by 30th St. in the finished station. Passengers on the New York-Washington line may reach the center of the city by going up from the temporary station to the suburban lines. A temporary roadway for taxicabs to and from the suburban and the New York-Washington station has been built out across the railroad yard to Market St. Similarly, a temporary foot passage connects these stations with Market St. and the present West Philadelphia station.

There are six platform tracks in the West Philadelphia suburban station. At the eastern end of the yard, out on the bridge, the number is reduced to four and the line continues as a four-track railway until it is below ground at about Nineteenth St. in Philadelphia, where it fans out into seven station tracks in the new station north of the Broad St. station. Ultimately this station will have nine tracks, but part of the area is still occupied by the embankment carrying the old Broad St. station tracks. Provisions have been made so that the number may be increased to twelve if necessary.

All tracks in this new station are at the lower level. At present there are four 1,100-ft. platforms at car-floor level. The design of the platform and track structure in the station is a departure from similar platforms built heretofore, in that the floor of the track trough has been made low enough for the car-repair men to walk along under the platform to inspect the undergear of the cars. The tracks are carried on deep longitudinal concrete beams, the rails being spiked to short wooden ties set in the concrete. Lockers and kit-rooms for the car-repair men are below track level under the platforms.

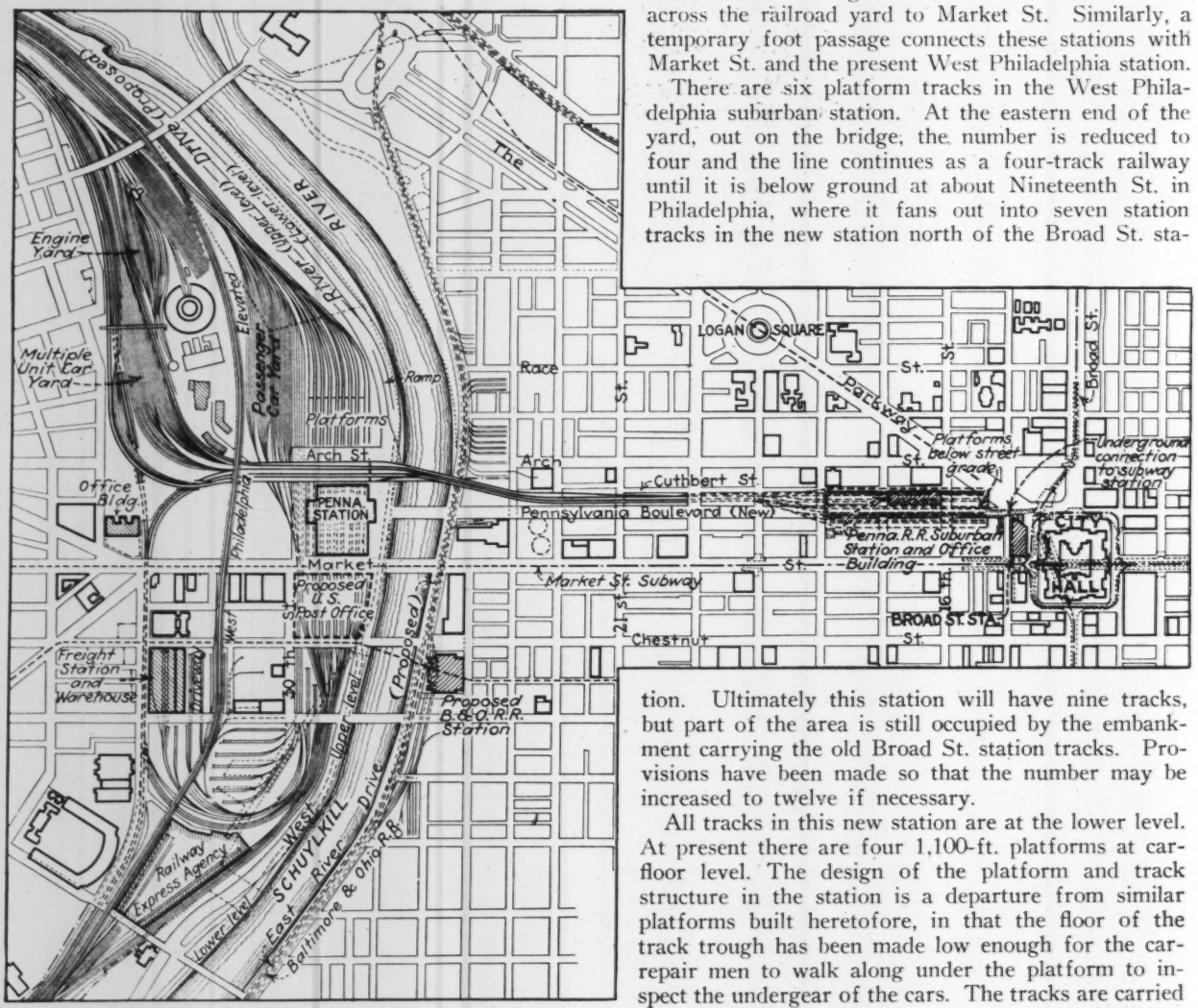


FIG. 2—PENNSYLVANIA RAILROAD IMPROVEMENT AT PHILADELPHIA

This plan shows the layout of the tracks and streets as they will be upon the completion of the work now in hand.

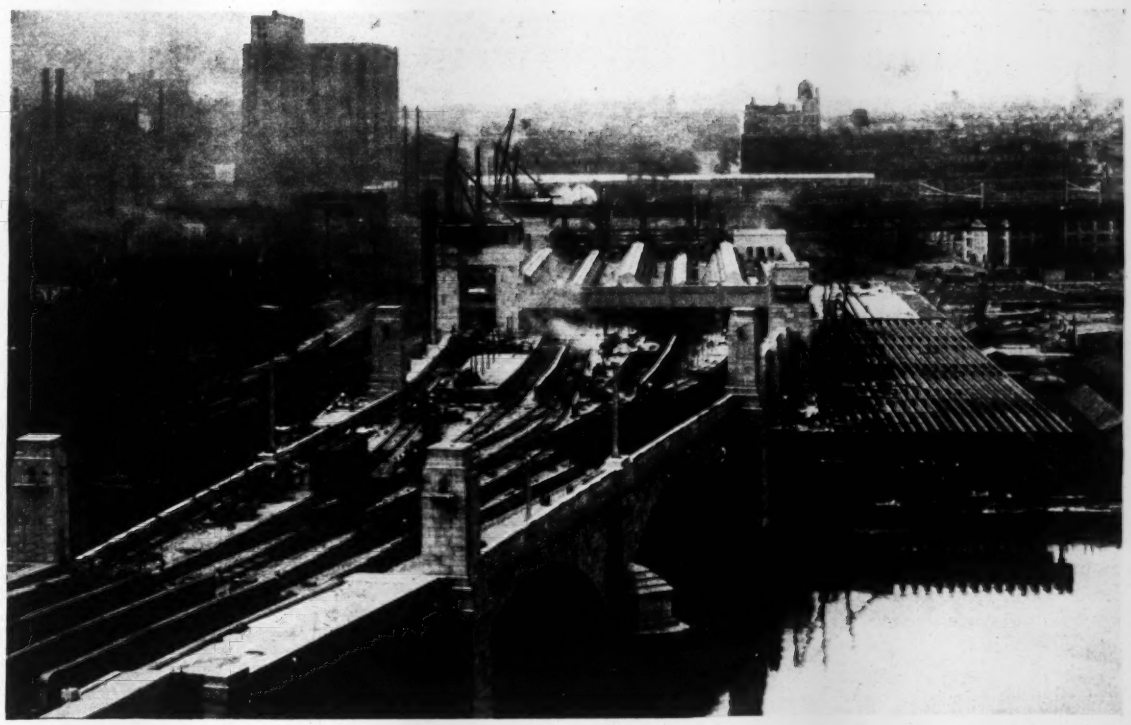


FIG. 3—WEST PHILADELPHIA SUBURBAN STATION

The station shown here is located over the north end of the area to be occupied by the main station. The major portion of that structure will occupy the area now occupied by the bridge-approach track in the left center. In the foreground is the new bridge over the Schuylkill River. At the right is the framework for the Arch St. Plaza and the upper level of a portion of the West River Drive. The platform track of the main station will pass under the Arch St. Plaza at the level occupied by the small buildings shown at the extreme left center.

The station concourse is directly over the central section of the platforms, 14 ft. above them and 15 ft. below street grade. It occupies the greater part of the basement of an office building in the block between Sixteenth and Seventeenth Sts., Cuthbert St. and the new Pennsylvania Boulevard. Four stairways and one elevator connect each train platform with the mezzanine floor, and two elevators connect the mezzanine with the street-floor level. Numerous exits give free access to the streets above the station and a wide underground passage leads out to the subway concourse under the City Hall plaza. Temporary connections also are provided to the Broad St. station.

All the station facilities, ticket offices, parcel check-rooms, restaurants, etc., are located on the mezzanine floor. No facilities for handling baggage are provided, as the station is designed primarily for suburban service.

An elaborate system of indirect heating and ventilation has been installed. The layout of the air-distribution ducts is complicated by the limited headroom available in the mezzanine floor. Generally the fresh air is distributed through shallow ducts above the ceiling of the concourse, which deliver air to the concourse through outlets made integral with the light fixtures, which are set almost flush with the ceiling. Steam for the heating is brought over from West Philadelphia power station through a large service duct built into the walls of the subway and elevated approach structures. Similarly located ducts carry cables for the power and signal systems. The interlocking plant controlling train movement in and out of the suburban station is located at the rear of the mezzanine floor.

Provisions for the construction of twenty-story buildings over the entire area in Philadelphia were made, as the station and track structures were being built in order to simplify future work. As noted previously, a twenty-story office building has been erected over the central portion of the suburban station. Throughout the remainder of the station, except under the street, footings for similar buildings have been put in and the columns carried up to street level. Outside of the station area, footings have been put in below the track, but no columns have been set up. All building columns are independent of the track and street framework, and every effort has been made to insulate them against the transmission of vibration from the station to the framework of the building above.

The whole project is laid out for electric operation. At present the suburban lines of the Pennsylvania at Philadelphia are electrified, and it is the multiple-unit trains of that service which now use the new underground suburban station. In 1928 the company authorized the electrification of its main line from Wilmington, Del., through Philadelphia to New York and of its main line west as far as Atglen, Pa. That work is now under way and will be well along toward completion by the time the new terminal is ready.

Work on the construction of the remaining portion of the West Philadelphia station will begin early next spring and it is expected that it will be put into service late in 1933.

Work is being carried on under the direction of Robert Farnham, chief engineer, Philadelphia Improvements, Pennsylvania Railroad. The principal contracts for the terminal work were let to the Keystone State Corporation, the United Engineers & Constructors, Inc., and the Brann & Stuart Co. The Schuylkill River bridge was built by the Dravo Contracting Co.

Lynn Harbor Improvements Include Sewage Disposal

New 60-In. Cast-Iron Pipe Outfall Sewer, Automatically Controlled Electric-Driven Pumps, Bulkhead, Dredging and Filling Flats and Deepening Ship Channel

By Myron G. Mansfield

Secretary, Morris Knowles Inc., Consulting Engineers, Pittsburgh, Pa.

With the recommendation to the rivers and harbors committee of the federal government, by the engineers of the War Department and the rivers and harbors board, for deepening to 22 ft. the present federal ship channel in Lynn harbor, the city of Lynn, Mass., has visions of a real harbor and a subsequent larger industrial center on the waterfront. The city has already completed or has now under contract work amounting to nearly $2,400,000 for harbor improvements as a part of a program for the development of Lynn as an important seaport and for abating a long-time sewage nuisance in the harbor. These improvements to the harbor will carry forward work already done by the federal and state governments resulting in a federal channel approximately 15 ft. deep and 300 ft. wide, completed about 1912, and a state channel in the Saugus River, 12 ft. deep and 200 ft. wide, completed about 1916.

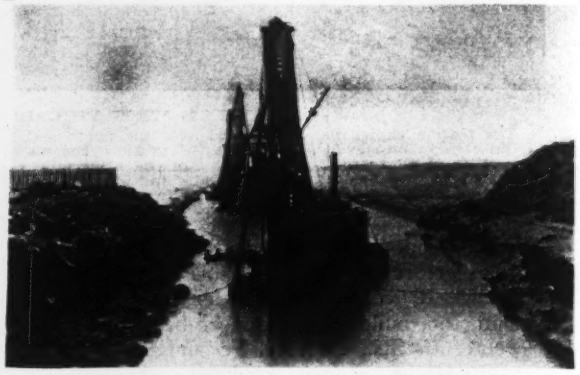
Elimination of Sewage From Harbor

The first step of the current program was the elimination of the sewage-pollution nuisance in the harbor. Sewage has been discharged into the harbor since the construction of the first sewerage system in 1870, resulting in extensive accumulations of sludge over a large area of tidal flats in the westerly part of the harbor. This was being added to by the every-day pollution from a rapidly growing city. As a result of the sewage nuisance and repeated admonitions by the state Board of Health, the state legislature in 1914 authorized a study of these conditions by a joint commission consisting of the state department of health and the city council of Lynn. The joint board recommended disposal by dilution through a deep sea outlet as being the most satisfactory and economical of various methods considered. The estimated cost of the project at that time was $800,000. Following the report of the joint board in 1916, little was accomplished until 1924, when the Massachusetts legislature approved the borrowing of $1,500,000 by the city for outfall sewerage work. The preliminary work was started early in the year of 1925. A new outfall sewer consisting of 15,243 ft. of 60-in. cast-iron pipe, supplemented by 1,289 ft. of 60-in. cast-iron pipe for storm-overflow and emergency use, together with an automatically controlled electric-driven pumping station with a daily capacity of 90,000,000 gal., have been in partial use since July, 1928, and in regular complete service since January, 1929. A bulkhead 4,500 ft. long was completed in December, 1929. Dredging of flats beyond the bulkhead and filling land behind it is now in progress. Deepening of the federal ship channel is in prospect. This article will describe all the work except the pumping station, which will be given attention in a later issue.

The sewerage system of Lynn is mostly of the "combined" type. Two main interceptors, known as the eastern and the western, are combined into a common outfall sewer, which leads to the sewage-pumping station.

Basis of Design—The outfall project was designed for 1960 estimated conditions, or a population of 170,000, including runoff from storms of average intensity within the tributary drainage area of approximately 4.3 square miles. It has been assumed that all future sewers will exclude stormwater and carry only domestic sewage and infiltration water to the outfall sewer.

As the two intercepting sewers have a combined daily capacity of approximately 90,000,000 gal. (90 m.g.d.),



TRENCH AND PIPE-LAYING CHANNEL FOR SHORE END OF LYNN OUTFALL SEWER

Trench for 60-in. cast-iron pipe dredged wide enough through flats to form side channel for pipe-laying boat. Piledrivers in foreground for sinking piles to support pipe. Piles used entire length of outfall except short distance of rock bottom. Derrick boat for laying pipe shown in background.

pumping units of this capacity have been provided. Capacity to deliver all of the heavy stormflow to the present outlet was considered unnecessary, as it was concluded that no nuisance would result from discharging a part of the diluted flow into the inner harbor. Provision has therefore been made for pumping into deep water at the rate of only 60 m.g.d. at times of high tide, and approximately 75 m.g.d. at low tide. The surplus is discharged through the relief line already mentioned with its outlet approximately 1,490 ft. from the shore line.

Outfall Sewer—From the pumping station adjacent to the north shore of the harbor, the outfall sewer extends southerly about 15,300 ft. to an outlet located some 3,600 ft. southwest of Bass Point, Nahant, in a minimum of 30 ft. of water. The inner end was fixed by a section of outfall sewer constructed in 1920, in anticipation of the project under discussion. The approximate location of the outlet was determined by means of float experiments previously conducted by the Massachusetts state department of health at all stages of tide and directions of wind. Final location of the outlet was so fixed as to avoid rock excavation.

The sewer was constructed of 60-in. bell-and-spigot cast-iron pipe, having a thickness of 1½ in. The first section of the line, approximately 8,500 ft. long, was laid at a uniform grade, some 10 ft. below the surface, with an average cover of about 5 ft. An inverted siphon was constructed under the federal ship channel, starting from the end of the first section and extending approximately 1,200 ft. toward the outlet. This allows for a channel approximately 30 ft. deep and 500 ft. in bottom width. The top of the pipe in the main section of the siphon is 35 ft. below mean low water. The section between the outlet end of the siphon and the special outlet is laid at a uniform grade somewhat greater than the first and has approximately 3 ft. of cover.

LOWERING PIPE FROM DERRICK BOAT

Four lengths of 60-in. cast-iron bell-and-spigot pipe were lead-jointed on boat deck, lashed to stiff-back and lowered by derrick, being guided to position by divers.

The outlet consists of a 30 deg. bend pointing upward, surrounded by concrete placed upon piles driven to grade. The outlet is located inside of a pile crib about 30 ft. square with the space between the outlet and the crib filled with gravel. The excavated area outside the crib was refilled with rock and gravel and the surface over the crib paved with granite slabs, specially cut and fitted to form a smooth and tight surface.

Provision has also been made for a future channel siphon for construction at such time as a connecting channel between the federal ship channel and the Saugus River channel is dredged.

Construction Methods—Dredging operations and pipe laying started at the channel section and first progressed toward the outlet. The material encountered consisted mainly of a very stiff blue clay which permitted excavating to steep slopes of approximately ½ to 1. The excavated materials for the outside section varied considerably, sand, clay and disintegrated rock being encountered, while the inside section consisted mainly of sand with some silt and layers of clay.

The trench for the entire length of line was excavated with a bottom width of approximately 10 ft. to an elevation about 2 ft. below the invert of the pipe and with side slopes flat enough to prevent the material from running into the excavation. Except in the federal ship channel, 2-to-1 slopes proved sufficiently flat to prevent movement of the materials forming the sides of the excavation. For the length of the sewer across the flats, it was found necessary to excavate a considerably wider trench than for the outward section in order to avoid stopping operations during periods of low tide. A channel, therefore, was dredged adjacent to the pipe-trench excavation suitable to permit the floating of barges for transporting excavated materials and operating the large derrick boats used for laying the pipe at all stages of tide. This channel, or additional width of excavation, extended approximately 43 ft. from the center line of the pipe. As the contract for laying was on a linear foot basis, inclusive of all excavation, the quantity removed, other than the minimum required, was optional with the contractor and at his expense. The excavated material from the outward section of the sewer, the channel section and approximately 1,600 ft. of the inside section adjacent to the channel was disposed of at sea, while the material excavated from the remainder of the inside section was backfilled over the pipe already laid at the outward end.

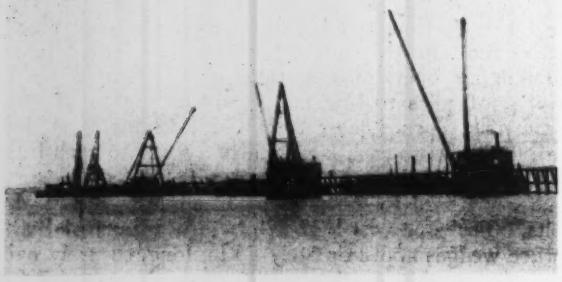
Dredging operations were closely followed by the driving of piles to line and grade by means of steam hammers. Spruce piles were used, 12 to 30 ft. long, with two piles to each bent and two bents to each length of pipe. Each bent was capped with an 8x8-in. spruce timber fastened to the piles by means of ¾x18-in. drift bolts. The pipe was held in place by means of 8x8-in. spruce wedges approximately 24 in. long, securely nailed to the caps. For a distance of approximately 1,700 ft. it was found impossible to drive piles because of ledge rock and hardpan. There special caps were used.

All pipe and other materials were unloaded and stored at the Saugus River yards of the Boston & Maine Railroad, adjacent to the plant of the General Electric Co. A dock was constructed at the Saugus River for loading the pipe onto derrick boats. Four lengths of pipe, forming sections varying in length from 48 to 50 ft., were made up on the deck of a special lighter or derrick boat. (Some of the pipe was 12 ft. long and some 12 ft. 10 in.) The three joints were made in the usual manner, with jute and pig lead calked with air hammers. On the spigot end of each of the 48- to 50-ft. sections of pipe a continuous strip of lead was cast, using a cast-steel ring with a slight taper as a mold. The lead was extended about ⅜ in. beyond the end of the socket or bell of the adjoining pipe in order to provide sufficient material to fill the groove in the socket when calked by divers. This formed the "submarine" joint or connection between the two long sections of pipe when laid in place.

The built-up sections of pipe were handled by means of a specially constructed frame stiff-back about 45 ft. long and 4 ft. high, which was placed on the top of the pipe and securely lashed to it by means of two slings under each pipe. The sections were carefully lowered onto the pile bents and guided to place by divers. Because of the small amount of clearance between the inside of the bells and the lead strips cast on the spigot end of adjacent sections, care had to be taken in joining. To join the two sections satisfactorily it was necessary to have each in almost exact alignment, thus insuring a perfect joint. The joint was then completed by securely calking the lead forming the precast strip into the bell of the adjacent section by means of pneumatic hammers operated by divers.

After short sections of completed sewer were laid, a watertight bulkhead was placed at both ends and the pipes were tested for leakage with a vacuum pressure of approximately 5 lb. per square inch. Because of the large amount of pressure which would be exerted on the bulkhead if the head just named was placed on it, thus tending to pull the joints apart, an equivalent vacuum pressure was used instead and the water seeping into the line measured to determine the leakage. Allowable leakage permitted by the specifications was approximately 30,000 gal. per day per mile of pipe. The actual leakage was less than one-half this amount. The pipe was tested both before and after backfilling, the latter to determine if any displacement of the pipe had taken place. Backfilling the pipe was done by small scows having capacities of not more than 100 cu.yd., the scows being securely moored over the pipe before dumping.

All elevations were obtained by an accurate system of levels from benchmarks established within the city and adjacent territory, the levels being tied in with the U. S. Army base, the Charleston Navy Yard base and the city of Lynn base. Control gages were set at each end of the sewer and all elevations were obtained therefrom.



LYNN BULKHEAD UNDER CONSTRUCTION
From left to right: driving main piles; driving low spurs; removing straighteners; framing high spurs; placing sheeting.

Instrument stations, range piles, pile bents with long crossarms spanning the trench upon which the center line was established, and side ranges for the spacing of pile bents, were constructed along the sewer for controlling the dredging, pile-driving and pipe laying.

The outfall pipe was supplied by U. S. Cast Iron Pipe & Foundry Co. and the Warren Foundry. It was laid by the Merritt-Chapman-Scott Corp., New York City. The cost of the outfall work totaled $1,012,700; borings, $9,500 15,243 ft. of 60-in. cast-iron pipe, with special castings, $427,500; trenching, piling and laying, $486,500; 1,289 ft. of 60-in. cast-iron pipe, laid (storm-over flow and emergency outlet), $89,200.

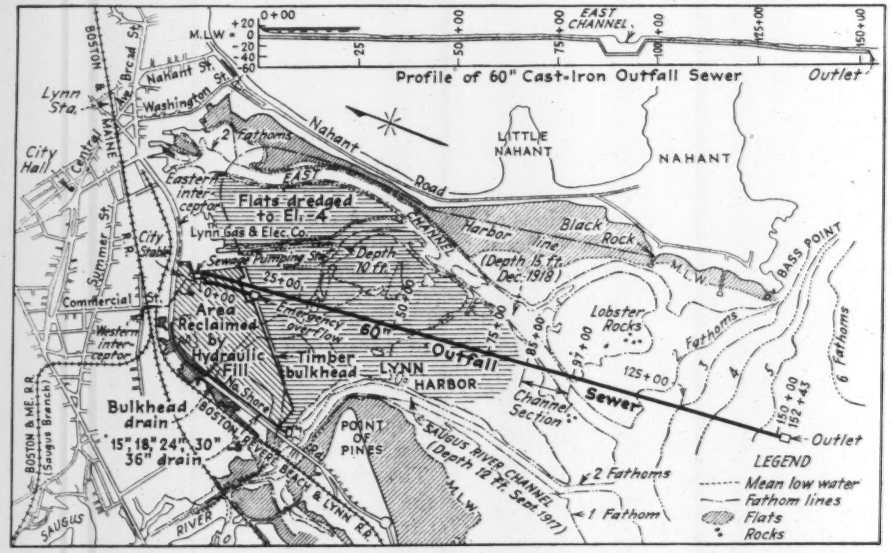
The second major step of the present harbor development and improvement program was the enactment of a bill by the Massachusetts legislature in 1927 approving a loan of $500,000 for the abatement of the nuisance created by the sludge deposits of many years over the tidal flats. This work involved building a timber bulkhead approximately 4,500 ft. long from the Broad St. bridge over the Saugus River, following the approximate route of the state harbor line, to the porperty of the Lynn Gas & Electric Co.; dredging the flats in front of the bulkhead and placing the dredge material back of the bulkhead as fill; and laying a surface-water drain for the areas on each side of Broad St. which were affected by the construction of the bulkhead.

Timber Bulkhead—The bulkhead consists of about 3,000 ft. of plain section and 1,500 ft. of anchor section. The top of the bulkhead is at El. +16. The plain section consists of vertical piles with two spur piles on the harbor side securely bolted to the vertical pile, the top of the spur piles being at El. +13 and +6. Three 10x10-in. and one 12x10-in. timber wales, equally spaced, are firmly bolted to the vertical piles and provide the supports for the 4-in. sheeting.

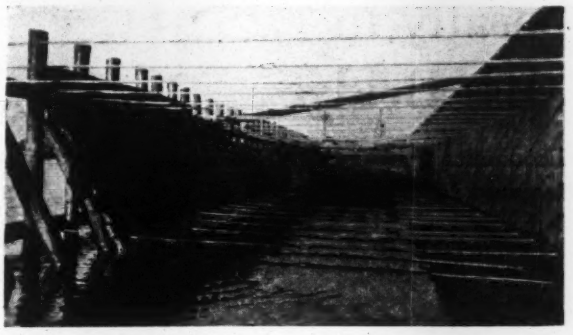
The anchor section is constructed similar to the plain section, with the addition of an anchor of vertical and spur piles driven 30 ft. back of the main section, the two sections being tied together with either one or two 1½-in. galvanized wrought-iron rods at each bent. Pile bents were spaced 5 ft. apart.

Piles are creosoted yellow pine, varying in length from 35 to 50 ft., with a minimum diameter at the butt of 12 in. Sheeting is 4-in. creosoted yellow pine, dressed on both sides and grooved for 1x2-in. splines. The sheeting is from 24 to 40 ft. long, depending upon the nature of strata penetrated.

Hydraulic Dredging and Fill—A large area of the flats in Lynn harbor were exposed at low tide, adding materially to the nuisance resulting from the deposits of sludge. To eliminate this condition, the area outside of the bulkhead is being dredged to El. 5±, the dredged material being placed behind it. As a large portion of the area back of the timber bulkhead is covered with this sludge deposit, the nuisance caused thereby is eliminated by the hydraulic fill. When dredging operations are completed about 160 acres of ground will be made available for industrial development adjacent to the harbor.



SKETCH MAP OF LYNN HARBOR



ANCHOR SECTION OF BULKHEAD READY FOR FILL

The final elevation of the filled area will be approximately +15. Dredging and filling operations are being carried out with hydraulic dredges and pontoon lines, the dredges being both steam and electrically operated. The hydraulic dredging and filling is now in progress, approximately 275,000 cu.yd. having been completed to date, of a total yardage of 2,250,000.

Surface Drain—As a large area is to be reclaimed by the timber bulkhead and hydraulic fill, it became necessary to construct a surface drain to provide not only drainage for this area but for Broad St. and for an area westerly thereof, which formerly interconnected with it by means of three culverts underneath Broad St. As the area westerly of Broad St. is subject to tide flows above El. +9, drainage facilities are being provided.

A surface-water drain varying in size from 12 to 36 in. is being constructed parallel to Broad St. and at sufficient elevation to provide drainage for the area westerly thereof to +1. The drain is approximately 4,500 ft. long and extends about 100 ft. outside of the bulkhead at the Saugus River. A portion of the line is laid on pile bents. Two tide-gate chambers equipped with tide gates have been constructed just inside the bulkhead to prevent tidewater from backing up into the sewer and to the area westerly of Broad St. The drain was about 90 per cent completed July 1, 1930. The cost of this part of the work will total about $894,800: bulkhead, $273,800; hydraulic fill (estimated), $560,000; surface drain, $61,000. The bulkhead was constructed by the Bay State Dredging & Contracting Co. The hydraulic fill is being carried out by the Trimount Dredging Co., and the drain by Anthony Baruffaldi, all of Boston.

The third step in the harbor development and improvement program will consist of deepening the federal ship channel and constructing a turning basin or channel adjacent to the bulkhead, connecting this channel with the existing state channel in the Saugus River. The bill already passed by Congress contains an appropriation of $615,500 for deepening the federal ship canal.

The Editor Afield

—*Seen in the Twin Cities*

ST. PAUL has an unusually large building program, both public and private, under way and in early contemplation. The First National Bank is erecting a 30-story office building, twice as high as any existing building in the city, at a cost of $3,000,000. Paul Steenberg is general contractor. Connoly did the foundation work. Foley Brothers, Inc., is at work on a six-story reinforced-concrete office building for the Northern States Power Co., being built in the front yard of the City and County Building. The city and county property has been sold and new quarters must be provided within three years. The Northern States Building will cost about $700,000. A 16-story addition to the Medical Arts Building is under construction by the F. J. Romer Construction Co., to cost $600,000. A new garage and addition to the Lowry Hotel and an addition to Fields Schlick department store, all being built by Lovering & Longbotham Co., will cost $900,000; $500,000 is being spent for a new public safety building to house the police, fire and health departments.

Plans are under way and money is available for a new $4,000,000 city and county building and a $1,500,000 addition to the municipal auditorium in St. Paul. Building permits issued in St. Paul to July 1 total $7,156,000 compared with $4,427,000 in the same period last year.

St. Paul has an extensive street-widening program under way. Third St. is being widened to 56 ft. between curbs for a distance of 4 miles and two viaducts are included in the program. Seventh St. is being widened for 4½ miles and University Ave. from Dale to Rice St., now 80 ft. wide, will be widened to 120 ft. The street-widening program along with the public building projects is largely financed by a $15,000,000 bond issue authorized in 1928.

The eastern branch of the Kittsondale sewer tunnel in St. Paul has a new type of spiral drop shaft 100 ft. deep. The shaft, designed by C. M. Colestock of the city sewer department, resembles the winding stairway in Bunker Hill monument, built in 6-in. risers around a 36-in. dry shaft in the center. Colestock has designed smaller shafts of similar design built of precast concrete risers. A. Guthrie & Co. built the large shaft and 5,000 ft. of 11-ft. tunnel from the shaft to the river. The Northern States Contracting Co. built 1,000 ft. of 10-ft. tunnel leading into the shaft. This latter company is driving a 7,000-ft. tunnel on the western branch of the Kittsondale sewer.

With a total of 280 miles of paving and 400 miles of grading, Minnesota's highway program for this year is more than 50 per cent greater than that of the past two years. Highway expenditures will total $15,000,000.

As has been the practice for years, Minneapolis is doing all of its street paving, sewer, water and bridge work by the day-labor system. About $4,500,000 worth of work will be done in this manner this year. Although this practice has been viciously attacked many times by contractors and others, the city engineer, N. W. Elsberg, stands by his guns and goes ahead with his programs. The whole system is under the civil service, even down to the laborers, who, by the way, are paid $5.50 for eight hours' work. Work done this year will total $750,000 for paving, $1,500,000 for sewers, $300,000 for a 40-m.g. unit at the water-filtration plant and $150,000 for a 48-in. steel water main.

The city of Minneapolis is proposing a diagonal high speed boulevard from the western city limits into the business section. The road will be 100 ft. wide, including a 24-ft. center parkway, and will occupy part of the present right-of-way of the Minneapolis & St. Louis Railroad, the tracks to be moved to a new location. This work will cost $4,000,000, of which $100,000 will come from the state highway department, $800,000 from Hennepin County and the rest from special assessments.

Silicon Steel Used Liberally in 1,257-Ft. Continuous Truss Bridge

Special Steel and Continuous Construction Result in Economies in Mississippi River Highway Bridge at Quincy, Ill.—Deep Piers Required for Main Spans

By Irving L. Pesses
Resident Engineer, Strauss Engineering Co., Chicago

CONTINUOUS-TRUSS construction over two channel spans of 627 ft., and extensive use of silicon steel in the trusses, are special features in the highway bridge now being built across the Mississippi River at Quincy, Ill., and named the Quincy Memorial Bridge in honor of the local men who served in the World War. After careful comparison of continuous-truss, simple span and cantilever designs the first was found to be the most economical, while a further noticeable economy was effected by liberal use of silicon steel. The trusses are 69.75 ft. deep, center to center of chords, and are spaced 31 ft. apart center to center. Their panel length is about 31.37 ft. Figs. 1 and 2 show the big spans under construction.

General Description—The deep-water channel on the Illinois side is spanned by the continuous-truss riveted steel structure, 1,257 feet long, covering two spans 627 ft. 8 in. center to center of piers. Its lowest steel is about 55 ft. above extreme high water and 70 ft. above the average stage of the river, while the roadway is about 61 ft. above high water. As the bank is high on the Illinois side, only eight approach spans are needed, including girder spans of 78 ft. and 99 ft. and I-beam spans of 35 and 50 ft. This approach has a grade of 1 per cent and a curve of 12 deg. to bring it into line with Maine St., the Quincy end of the bridge being within a few blocks of the center of the city.

Across the shallower part of the river, on the Missouri side, there is a 1,695-ft. viaduct of 27 spans, the first half of which descends from the main bridge on a grade of 4.95 per cent in order to reach the low ground on this side of the river. There are eleven girder spans of 78 ft. and sixteen I-beam spans of 50 ft. The total length of the bridge between abutments is 3,508 ft. A reinforced-concrete slab 20 ft. wide between curbs forms the roadway, and is extended to form 4-ft. sidewalks, all between the trusses. On the girder spans (Fig. 4) this concrete deck is carried by transverse 21-in. I-beams cantilevered 6½ ft. beyond the girders, which are spaced 15 ft. center to center.

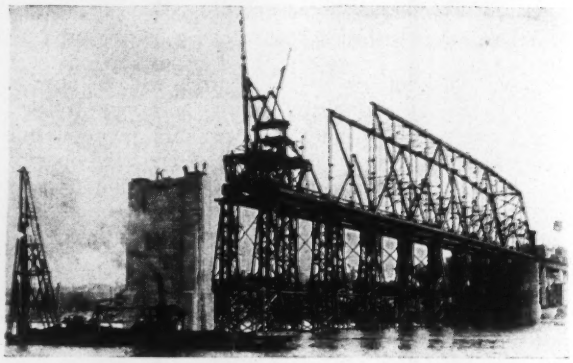


FIG. 1—ERECTING FIRST MAIN SPAN, QUINCY BRIDGE
This 627-ft. half of a continuous truss is between piers 8 and 9; shoes are being placed on pier 9.

Substructure—There are 36 piers and two abutments. All piers are in the water, with the exception of the seven for the Illinois approach; these are founded on rock at depths ranging from 5 ft. at the abutment to 30 ft. at pier 7. The east river pier and center pier of the channel spans are founded on rock, pier 8 being built in open cofferdam, while pier 9 consists of two reinforced-concrete caissons sunk partly by dredging and partly by the pneumatic system. The west pier, No. 10, is supported on piling, as borings showed rock at such a depth as to preclude the use of the pneumatic system.

This depth to rock below mean low water at the three piers of the main spans is about 20 ft., 105 ft. and 121 ft., respectively. Below ground, pier 9 has two cylindrical shafts, while above ground there are two rectangular shafts or columns connected by a heavy curtain wall, as shown in Fig. 6. Piers 8 and 10 have rectagular footings, above which they are similar to pier 9. On the west approach (Fig. 5) all the approach piers have untreated pile foundations and each pier consists of a pair of rectangular columns connected at intervals by diaphragms.

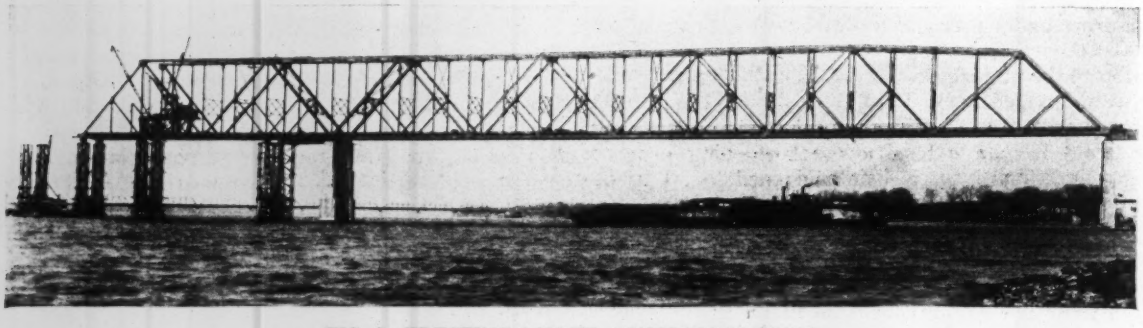


FIG. 2—ERECTING 1,257-FT. CONTINUOUS TRUSS
Work is extending over the second span from piers 9 to 10.

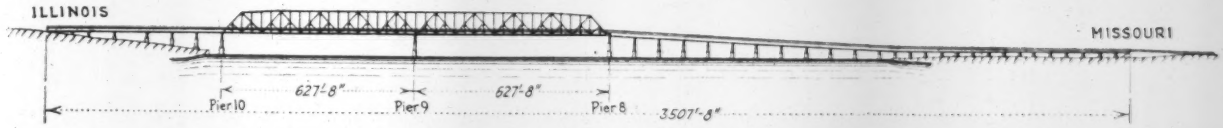


FIG. 3—MISSISSIPPI RIVER HIGHWAY BRIDGE, QUINCY, ILL.

Loading—The floor system and stringer spans were designed for a live load of one 20-ton truck for each traffic lane. The trusses and girders were designed for a uniform load of 600 lb. per linear foot for each traffic lane and a single concentrated load of 28,000 lb. The sidewalk on the stringer spans was designed for 100 lb. per square foot of sidewalk area. For the sidewalks on the trusses and girder spans the following was used: $P = (80 - L/8)\ (1 - W/40)$, where P = live load in pounds per square foot of sidewalk area, with minimum of 20 lb; L = loaded strength of sidewalk in feet, and W = clear width of sidewalk in feet. Transverse wind load was taken as 30 lb. per square foot on 1.5 times the area of vertical projection of span plus 150 lb. per linear foot. The longitudinal wind load was taken as seven-tenths of transverse wind load.

East Pier—The first river pier of the main span (No. 8) was founded on solid rock 20 ft. below low-water elevation. Details are shown in Fig. 6. Two cofferdams were constructed, 15x17 ft., with steel sheeting having a length of 40 ft. Considerable trouble was experienced in pumping out these cofferdams, it being required that the footing should be placed in the dry. Several blow-ins occurred, making it necessary to redrive this sheeting several times with the hope of penetrating the hard rock at least several inches. As the rock was found to slope about 6 ft. in the width of the cofferdam, it was stepped down in horizontal layers, all loose rock being removed. In addition, twenty holes were drilled 2 ft. deep in which 1-in.-square dowel rods were set for added security.

Center Pier—The construction of pier 9 offered several interesting features. The original plans contemplated the use of two cylindrical steel shells 35 ft. high, using $\frac{3}{8}$-in. steel plates for the inner and outer walls. The working chamber and cutting edge were likewise steel. Provision was also made for four 2-in. jet pipes. At the request of the contractor these plans were changed to permit the use of steel cylindrical frames 20 ft. high lagged with 3x6-in. wood sheeting on both the inner and the outer walls, and surmounted by timber caissons 20 ft. high. Standard sectional panel forms were then used to complete the caisson. A circular timber cofferdam was constructed on top of the completed caisson so that the pier shaft could be constructed under dry conditions. The diameter of the caissons at the cutting edge was 21 ft., with a working chamber 8 ft. in height. The dredging well was 8 ft. in diameter.

A heavy pile and timber platform for both the north and the south caissons carried two heavy A-frames

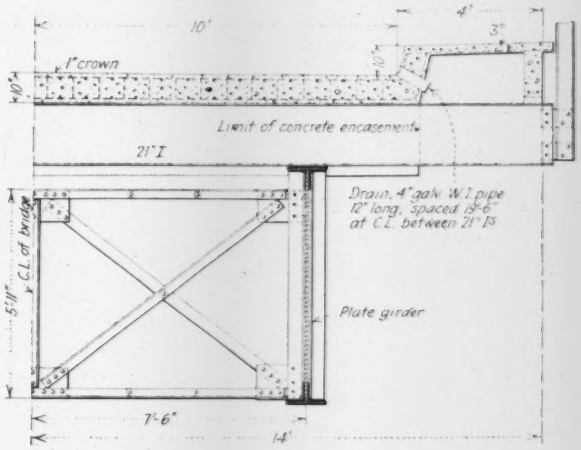


FIG. 4—DECK CONSTRUCTION ON GIRDER SPANS

spanned by 24-in. I-beams. Four $2\frac{1}{2}$-in. screw rods having a length of 20 ft. were suspended from these I-beams and attached to the caissons by means of cable slings, as shown in Fig. 7. Here the north caisson is shown sunk for a depth of 60 ft. below the water surface and the south caisson is partly lowered.

The working chamber and wall were concreted in lifts of 3 and 4 ft. as lowering progressed, the caissons being lowered and held in position by means of the screws until the cutting edge penetrated the riverbed several feet. The cable lashings were then cut loose and sinking was resorted to by open dredging through the well. Both caissons were sunk in this manner for a depth of approximately 80 ft. below the water surface, after which compressed air was applied. The caisson had been built up for a height of 100 ft. when the air was applied. The deck was placed approximately

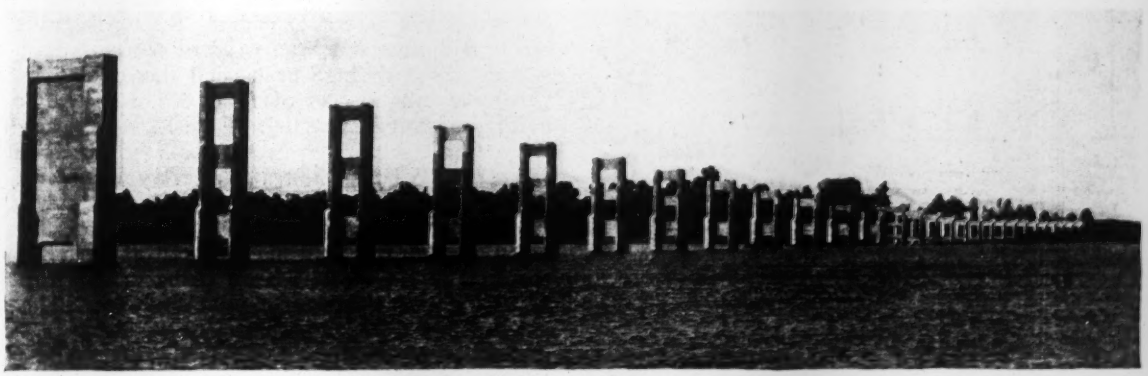


FIG. 5—PIERS OF WEST APPROACH
These piers are for 80-ft. girder spans. At the left is pier 10, for one of the 627-ft. channel spans.

80 ft. up from the cutting edge, offsets having been provided in the dredging well for this support. Two steam compressors on shore delivered air through a 4-in. pipe line 700 ft. in length, laid on the bed of the river.

These caissons were sunk to a total depth of 111 ft. below the water, the stage of the river being about 5 ft. above mean low water. The north caisson was landed on rock in nineteen working days after air pressure was applied for a total sinking of 26 ft. through an exceptionally hard material consisting of a mixture of sand, clay and gravel. The south caisson was landed on rock in fifteen working days for a total depth of 21 ft. A pressure of 48½ lb. was recorded on the air gages when the rock was cleaned. An inspection in both caissons showed the bedrock to be exceptionally hard limestone with numerous deep ridges, forming a perfect key for the bottom of pier.

West Pier—This third main pier, No. 10, is constructed upon 168 timber piles (see Fig. 6), varying in length from 27 to 35 ft. The base of the pier consists of a seal 63x24 ft. and 10 ft. thick and a footing 54x13 ft., also 10 ft. thick. A cofferdam was constructed with 50-ft. sheet piling in spliced lengths. The plans required that 18 ft. of this sheet piling, extending 15 ft. below the bottom of the seal, should be left in place. With this in view, four lengths of sheeting were used, 18 ft. and 20 ft. for the bottom portion, and 30 ft. and 32 ft. for the upper portion. These alternate splices were held by means of a ½-in. plate and two ½-in. bolts. Upon completion of the pier, the sheeting was pulled in the regular way, the ½-in. bolts shearing off at the splices, allowing the lower portion to remain in place.

For driving the timber piles, a skid piledriver rig was constructed on top of the cofferdam. On account of the depth of the water inside the cofferdam, telescopic

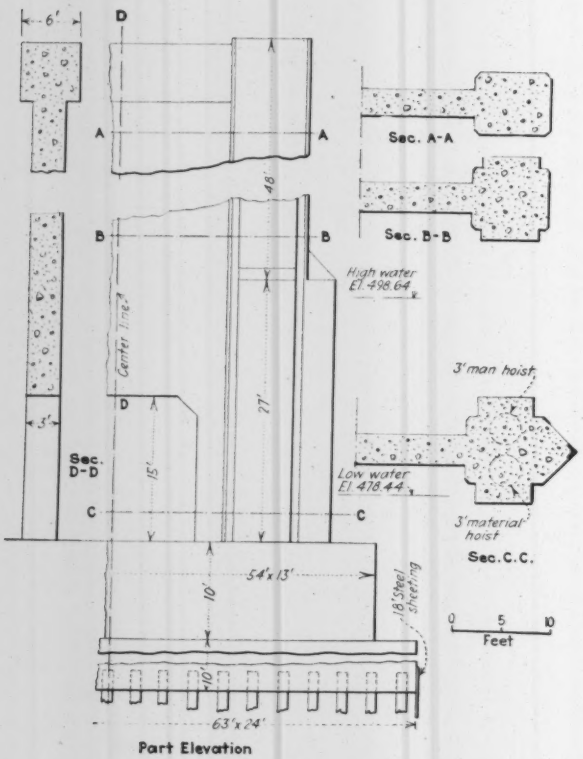


FIG. 6—DESIGN OF RIVER PIERS

Pier 8 has footing on solid rock. Pier 9 has concrete cylinder foundations. Pier 10 has sub-footing on timber piles.

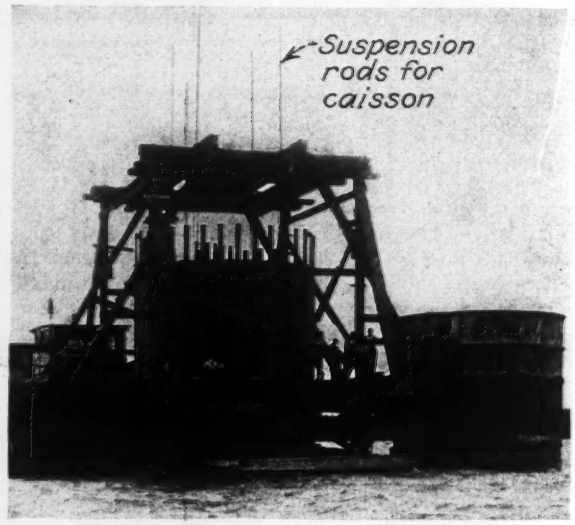


FIG. 7—SINKING CAISSONS FOR PIER 9

leads were used so that the piles could be set and held at their correct locations. The piles were 30 ft. in length and the water was 35 ft. deep.

Steel Erection—Owing to delayed completion of the middle pier (No. 9) it was necessary to change the intended mode of erection. The original plan provided for starting at pier 9 and erecting both halves of the main span simultaneously, cantilevering part way and using pile and timber falsework supports where necessary. However, in order to progress as far as possible with the erection of the 1,254-ft. continuous span, prior to completion of this pier, it was decided to start at pier 8 (east side) and so to gage the erection progress as to be ready to land on pier 9 soon after its completion. Shoes and bottom chord steel were actually landed on pier 9 two days after the pier was finished (see Fig. 2).

The general scheme of erection involved the use of a single-boom traveler erected originally on top of the east approach girder spans and then moving to the west, erecting all steel in the project. This traveler was of timber construction with a steel A-frame, sills and back legs, and having a 70-ft. steel boom with a lifting capacity of 35 tons with boom flat. Steel was delivered to the traveler by a 5-ton gasoline locomotive on standard-gage tracks. A timber A-frame and 40-ft. boom on the rear of the traveler, operated by a 15-hp. steam hoisting engine, proved very effective in filling in light material behind the traveler, as the height of the traveler would not permit of erecting the top laterals, wind braces and other overhead parts of the truss span until it had passed through or beyond these points.

An elaborate system of falsework was used in supporting the east or first half of the 1,254-ft. span during erection. A piledriver barge was used in driving all pile bents. A bent was located at every main panel point and contained eighteen to twenty untreated cypress piles about 55 ft. in length, heavily braced and capped. Timber towers 40 to 50 ft. high, on top of the piles, were spanned by six 50-ft. I-beam stringers which were to be used for the permanent west approach. The semi-panel points were supported on these stringers. Upon completion of all the riveting in this span, the camber blocking was removed by means of jackhammers fitted with chisels, thus freeing or swinging the span.

Erection of the second or west span was simplified considerably by the elimination of the I-beam stringer supports and because it was possible to cantilever four panels a distance of about 125 ft., in the manner originally planned, at each end of the west span. Upon the completion of both spans, two 300-ton hydraulic jacks were placed under the floor beams at the roller ends (piers 8 and 10) and raised these ends until the tops of the floor beams were at the same elevation as at pier 9, at which elevation the actual and calculated reactions checked.

Because of extremely bad weather and river conditions, the progress has been delayed several months, with the result that the completion date of March 1, 1930, found the bridge unfinished but with all of the structural steel erected and riveted. Only the concrete floor and the painting then remained to be done.

Engineers and Contractors—This bridge project was proposed and financed by the Quincy Memorial Bridge Co., a local incorporated concern, of which Frank W. Crane is president and which is controlled by the city of Quincy and the Quincy Chamber of Commerce. The bridge was designed and its construction supervised by the Strauss Engineering Corp., Chicago, under the general direction of Joseph B. Strauss, president. C. E. Paine, vice-president, was in direct charge of the design and construction. The Kelly-Atkinson Construction Co., Chicago, was the general contractor, and built the land piers and erected the superstructure; W. J. Howard, president, was in direct charge of this erection, with Charles Chaney as superintendent. The Foundation Co., New York, erected all of the river piers, with John Hoskinson as superintendent, Frank Baras general foreman, and William Kaufman resident engineer. The American Bridge Co. furnished the steel. The writer is resident engineer for the Strauss Engineering Corp.

Lake Shore Protection Work at Lincoln Park, Chicago

Concrete Sheet Piling Forms Toe of Paved Slope—Timber Jetties to Create Sand Beach—Work by Park Forces

STORM DAMAGE along the lake front of Lincoln Park, Chicago, last winter, included the undermining and breaking up of large areas of the concrete paved beach, which damage is now being repaired, as shown in Fig. 2. The original construction, about 30 years old, consisted of a bulkhead 12 ft. wide having two rows of wood sheeting and round piles with loose rock filled between them, the piling being anchored by tie-rods to land piles. Over this bulkhead and extending inland was a concrete slab 47 ft. wide, laid on a bed of broken stone and having a slope of 1 on 12. The land slope the waves normally lose their force. The land side of the slope abuts against a retaining wall which rises 3 ft. above it and supports the fill for a 20-ft. concrete walk. Between this walk and the park area is a parapet wall. This construction is shown in Fig. 1. In some places the paving consisted of large granite blocks with asphalt-filled joints.

Undermining of the fill owing to breaks in the bulkhead, combined with the pounding of heavy waves on the top and the unusually high level of the lake, broke up the concrete slab and stone paving in several places, large portions being carried away and the fill scoured out. Heavy waves even ran over the beach walk, washing out the fill behind the retaining wall so that the 5-in. slab sagged and cracked in places.

For reconstruction, a single line of interlocking concrete sheet piles 10x18 in. in section and 16 ft. long is being driven behind the old bulkhead. Behind this sheeting, 10 in. thick, the rockfill and broken stone bed is replaced, dressed to the proper slope and covered with an 8-in. slab of concrete, reinforced near the bottom with rods in both directions at 4-ft. spacing. Anchor rods 6 and 8 ft. long run through the sheet piles to anchor plates embedded in the concrete. The slab extends the full 47-ft. length and is in widths of 30 ft. with asphalt-filled expansion joints between the sections and along the retaining wall. In some of the old work the concrete was in squares or panels about 12x12 ft., with asphalt joints, but in general it was of full width from bulkhead to retaining wall.

Pile driving is done by a 3,500-lb. drop hammer in leads suspended from the boom of a gasoline crawler crane which stands on timber pads on the old concrete slope. The crane handles the hoisting cable, the hammer line and a line supporting the hose of an iron jet pipe.

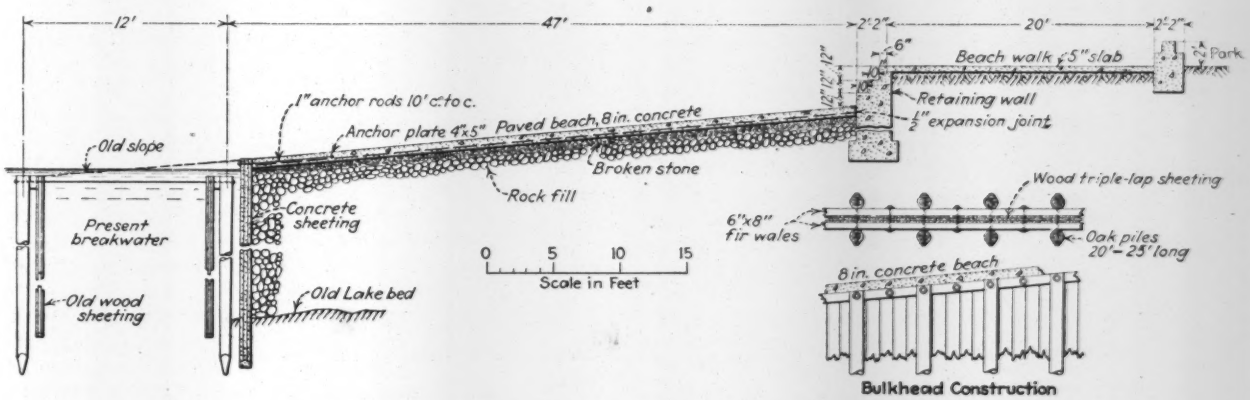


FIG. 1—SHORE PROTECTION AT LINCOLN PARK, CHICAGO

A steam pump supplies the jet. The hoisting cable has a U-shaped stirrup with looped ends; this is slipped over the end of the pile and attached to it by a bolt put through the pile. Before lowering the pile the jet pipe is worked down thoroughly through loose stone, mud and clay, and it is used again before the final blows which settle the head of the pile to grade, or 1 ft. above water level. A cushion of two or three thicknesses of plank nailed together is placed on the head of the pile to protect the concrete. The lower end of the pile-hammer leads is held in position by a line of tackle on each side and one in front.

The same crane handles a grab bucket for excavating the mud and debris where the shore protection has been destroyed and also places the new stone filling as a base for the concrete slab. At the ends of these reconstructed sections lateral timber bulkheads are built to separate the

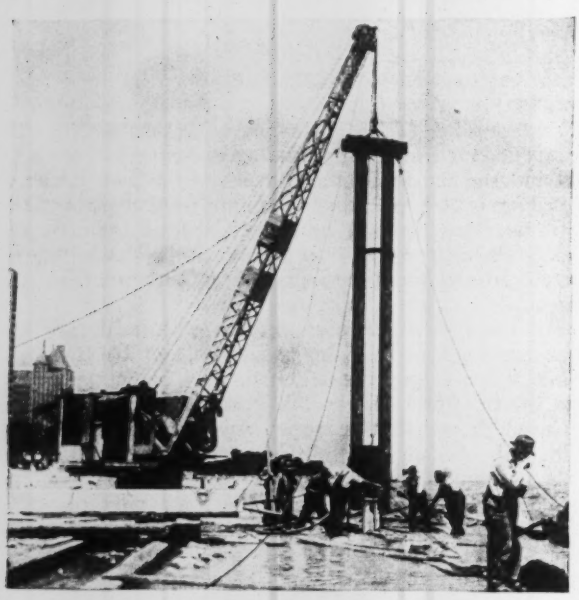


FIG. 2—DRIVING CONCRETE SHEET PILING
Next pile lying in front of crane. Steam pump for water jet at extreme right.

new work from the adjacent old and undamaged work. The bulkheads, also shown in Fig. 1, consist of two rows of round piles with waling timbers on the inner faces and a line of triple-lap wood sheeting between the wales.

At one point where a deep bay in the shore line exposes the shore to the sweep of waves in heavy northeast storms, a series of nine jetties 600 ft. apart and 500 ft. long has been built out from the paved beach. Each jetty is composed of two lines of round piles and sheeting with rockfill between. These jetties at present make a rather unsightly feature on the waterfront but are considered necessary as a protection to the paved beach and the park. Furthermore, from studies made by William Dean, formerly chief engineer, and Hugh E. Young, consulting engineer, it is expected that they will aid materially in building up a new sand beach which in time will practically conceal them.

All this repair work is being done by the forces of the Lincoln Park Commission. The foreman in charge, William Brown, was in charge of the original construction about 30 years ago and has been on the Lincoln Park force for 42 years. The interlocking concrete sheet piling was designed by Louis Schuttner, assistant engineer. All design and construction work is under the direction of John M. Egan, chief engineer, Lincoln Park Commission.

Important New Set-Up for Cement Committee

AFTER a period of many years, during which a single cement committee of the American Society for Testing Materials considered cement only as a uniform product, there has recently been announced the reorganization of committee C-1 on cement on the basis of recognition of different types of cement. With its tentative specification for high-early-strength portland cement and its upward revision of the requirements for standard portland cement now in effect, the committee hopes to develop fundamental and detailed studies of these two most widely used hydraulic cements and of the masonry or plastic cements, whose use is growing so rapidly.

The outstanding feature of the new plan of committee operation, according to a recent announcement of the A.S.T.M., places the investigations of each type of cement and the preparation of a standard under a separate sub-committee. For the present, there will be sub-committees on standard portland cement, masonry cement, and high-early-strength cement, the latter including both portland and high alumina. An additional sub-committee will have the duty of preparing the standards for methods of test. This sub-committee is said to be essential, since the society will issue the methods of test as separate publications from the physical and chemical requirements for all hydraulic cements. This sub-committee will not indicate to the other sub-committees what methods they shall use, but rather will help the other sub-committees develop and refine the methods believed to give some indication of the desired requirements.

An important part of the announcement is that the committee believes "the time is at hand to make extensive studies of the sometimes considered radical new test methods suggested by progressive users and producers." It is felt that studies should be made of those requirements of cement which are believed to be indicative of a needed property in the cement—something which has never been done before by the committee. It is further hoped that test methods can be developed which will be indicative of the deportment of the cement in use over a long period of time or under possible adverse conditions, rather than those indicating merely laboratory differences in cements.

The total membership of the committee is limited to 75. At the present time, however, when the sub-committees are developing new programs of investigational work, suggestions from all those interested in the testing and using of cement will be particularly welcome. The committee states its desire to have comments as to the types of tests which should be studied and to receive data indicating the adequacy or inadequacy of present methods, suggestions as to specific requirements, etc. The committee will continue under the chairmanship of P. H. Bates, Bureau of Standards, Washington, D. C.; F. H. Jackson, U. S. Bureau of Public Roads, Washington, D. C., as secretary; and A. C. Tagge, Canada Cement Co., Ltd., Montreal, and R. B. Young, hydro-electric power commission of Ontario, Toronto, as vice-chairmen.

Civil Engineers at St. Louis Meeting Discuss Basic Problems of a Large City

Inquiry as to Existence, City Preparedness, Vision in Regional Expansion, Water Drainage, Transportation and Highways, Foundations and Water Terminals Form Meaty Program

Engineering News-Record Staff Report

PROBLEMS of a basic nature to a large city formed the principal subjects discussed at the general sessions of the fall convention of the American Society of Civil Engineers, Oct. 1 to 4 at St. Louis. Four technical divisions held sessions. The construction division held largely to foundations. The highway engineers devoted one session to prequalification of contractors, this being the second meeting of a series on the same subject; the summary is to come in New York at the annual meeting. At another session the highway division discussed the Missouri state and the St. Louis county highway systems. Waterways and surveying were the subjects of two other division meetings.

Announcement was made of a 94.7 per cent favorable vote on the constitutional amendment stiffening up on the membership requirements. Official sanction was given by vote on the floor to the action of the board in increasing the number of directors from 25 to 26.

200 Students in Attendance

In the registration of 700 were 200 students from student chapters in Middle West engineering schools. Not more than 40 were expected, but some of the schools took this opportunity to visit St. Louis as the annual senior class inspection trip ordinarily taken in the spring. In consequence, the facilities for the numerous excursions so generously provided locally and for the all-day excursion to the Bagnell dam had to be greatly augmented at the last moment.

Concentration of the main technical meeting on a single theme worked out exceptionally well in St. Louis, a city long noted for its forward planning. A prominent banker eloquently answered the question of "Why the City." E. R. Kinsey, president of the board of public service for sixteen years, elaborated on his hobby, municipal preparedness, meaning planning for the future. A. P. Greensfelder, a contractor and chairman of the University City Plan Commission, presented a most thought-provoking paper on "Supervised Regional Expansion," a subject that has long agitated those interested and far-sighted enough to vision the rapid outward growth of St. Louis into the county. A second general session, following this one at which the general regional topics were discussed rather briefly and to little advantage, was devoted to four specific basic civil engineering utilities—water, municipal drainage, transportation terminals and mass transportation. These concrete subjects brought out a lively discussion.

City Problems

Assigned a historical subject, "Why the City," the banker brought many salient problems vividly to the attention of the engineers. Criticising the form of government, he rightly said that the chief functions of the American city government are not political but business. The American city is a concrete expression of the amazing energy, industry and genius of the American people, but is a social monstrosity gradually being modified into a more beautiful, a more sanitary and a more quiet habitation for man.

Starting with an intelligent vision of its probable future, said Mr. Kinsey, the city must prepare itself for its future by careful planning. Any other procedure will surely result in enormous waste, both of capital and of opportunity. Contributing to this waste are such items as inefficient harbor development, lack of modern river docks permitting efficient exchange between river and rail, cramped railroad terminals, inefficient street systems leading to docks, team tracks and terminal facilities, improper location of those businesses requiring transportation and other defects in the city which needlessly increase the cost of production and the cost of all service to the ultimate consumer. Those cities which correct them will be amply rewarded for their foresight and expenditures. Thus he led to that most commonly used term of the city planner, accessibility. It is a common experience in American cities that sections once useful and valuable have become nearly useless and valueless because the avenues of approach are so congested with traffic that they have been deprived of their accessibility.

Man Power Is City's Greatest Factor

An established plan well worked out to preserve accessibility and the other vital factors required before the location of an industry in a new area eliminates guesswork, creates land values and eliminates waste. Having attended to these factors, said Mr. Kinsey, there remains the greatest factor in the city, which is man power. Leaving out of consideration humanitarian concepts, it still will be good engineering to promote and conserve the health, comfort, convenience, happiness and morale of the people. There follow, then, plans relating to living conditions, pure water, good sanitation, enough light and air, and recreation facilities. The well-planned city is prepared to expand these facilitieis as its growth may require.

In Mr. Greensfelder's paper were the following views on a few of the many more or less unrelated topics covered. We try to instill in our citizenry the theory that planning minimizes taxation. The widening of streets before the construction of buildings fronting thereon is good city business. The mobility of the American people is rapidly crystallizing public opinion in favor of regional planning. Personal and popular appeal is too frequently overlooked by professional planners. Be a plan ever so perfect, it is useless unless adopted by the affected political subdivisions. It is not miles but minutes which interest the average suburban passenger. If wide strips of land along local streams were acquired, they would permit the cheap straightening of upper channels for stormwater as an alternative to expensive sewers and at the same time provide "low-ways" for parkway purposes. The co-ordination of highways with railways,

waterways and airways is essential. The elimination of rail and highway grade crossings is an important problem in regional planning. Airports are one of the most modern essentials for rapid transit. The engineer's application of the general sciences to planning has been more or less remote. We are apt to forget that scientific achievement alters community needs. The influence of science upon planning has therefore a direct reaction. How may the airplane change our habits? Will suburban land values increase or decrease?

Water Supply and Drainage

"Water Supply," the subject of the first paper on a specific city problem, by E. E. Wall, consultant, St. Louis, contained a historical account of the development of water-supply engineering, purification and operation to its present high state of efficiency. However, he indicated, many phases of water engineering are continually undergoing revision and change as the thousands of engineers work with and upon them the world over. As the city itself grows and is never finished, so must the waterworks be extended and kept well in advance of the present demand.

"Municipal Drainage," the topic assigned to W. W. Horner, chief engineer, sewers and paving, St. Louis, related to stormwater. The ideal plan, he said, involves a separate system, of which the first part is an amply designed sanitary system, accepting downspout connections as inevitable and designing capacity accordingly. The ideal stormwater system involves to the greatest practical degree the use of natural drainage and reduces the construction of artificial storm drains to a minimum. In general it would be more economical to spend money for the acquisition of natural waterways than for the construction of large storm drains. The large closed sewers of the River des Peres system cost more than $200 per foot. Thirty years ago one-tenth of this sum would have purchased a strip a quarter of a mile wide up the valley and would have prevented development in the lowlands. Where lowlands are already occupied the best solution might involve taking a "drainage way" consisting of the watercourse and only enough marginal land to permit of such channel improvement as will lower flood planes below private improvements. St. Louis County has sewers in only a few of the borderland towns. The remainder of the area is seriously insanitary. Under new legislation a system of sewers for 25,000 acres, estimated to cost $15,000,000, is now being discussed. A plan approaching the ideal has been adopted.

In discussing the economic aspects—that is, the relation between the usefulness of land and the cost of drainage—S. A. Greeley, consultant, Chicago, called attention to the fact that the subject as developed by Mr. Horner related primarily to valley lands rather than to uplands. Flat terrains do not offer to any great extent an opportunity to set aside valley lands for drainage purposes. The use of low areas for the disposal of clean ashes, waste building material, street cleanings and similar relatively stable city refuse may often constitute a highly valuable use. The value for dumping should be considered in the cost balance.

N. T. Veatch, Jr., consultant, Kansas City, indicated that many large real estate companies have adopted the ideal of leaving watercourses more or less unencroached upon. Beautification was their actuating motive. The great trouble lies in the fact that the engineer is called in too late to make the adoption of the open stream plan feasible. This means that there is vital need for control in the development of suburban areas. Addition of roof water to the sanitary sewers is not so feasible if the sewage is treated, in his opinion.

Problems of Transportation

"Co-ordination of Terminals" was the subject of a paper by F. G. Jonah, chief engineer, St. Louis-San Francisco Railway Co. He pointed out principles governing closer co-operation rather than details of operation. For passenger traffic single-agency service as at St. Louis is satisfactory and efficient, but in Chicago a single station would unduly congest adjoining street traffic. Thirty-six tracks is near the limit. Bus terminals should be near rail terminals. The bus lines are finding need for highway stations with hotel accommodations outside of the cities. Airport terminals will always be outside, but combined train and plane traffic require co-ordinated schedules. Freight terminals around which cities have grown up could well be moved to outer group yards minimizing switching through cities and across streets. Keen competition for freight makes the railroads look with disfavor on co-ordination in freight handling, but he feels that it will come as it did in the express business.

J. E. Root, assistant engineer, Cincinnati Terminal Co., spoke in discussion of the progress in getting seven railroads now using five stations into one station 2 miles from the business district. The new freight service will cost $75,000,000 and the passenger station is charged up with $41,000,000.

R. G. Waggener, consultant, Dallas, compared common freight terminals to a clearing house for competing banks and indicated great savings possible. Further, he said, facilities are now available and sufficient. The Markham yards at Chicago can handle, he held, the freight of most of the roads entering Chicago.

"Mass Transportation," the last of the city problem papers, by R. J. Lockwood, consultant, St. Louis, was a brief for the street railways. Municipal partnership with the city owning and company operating the facility was advocated as the solution of the present financial difficulties of the roads. The very existence of the average large city is dependent on the efficiency of its several agencies of mass transportation, he stated, but the problem is less engineering than it is financial and political.

Technical Divisions

Construction Division — Becoming familiar with twelve-month construction during the war, the building industry and the public have substantially increased winter construction. This was the observation in a paper on the subject by James S. Taylor, chief, division of housing, Bureau of Standards, Department of Commerce. Custom, not climate, is mainly responsible for seasonal idleness. It is the special task of the engineer, Mr. Taylor warned, to familiarize himself with methods and costs of more or less continuous operations and with probable delays that may be expected in spite of precautionary measures.

Semi-empirical rules, although derived from experience, as follows were given by L. R. Viterbo, consulting engineer, St. Louis, in his paper on "Floating Foundations": Good, solid, homogeneous and compact, proved rock has always a bearing capacity sufficient to carry any load superimposed on it. Gravel or sand not subject to movements occasioned by subterranean water motion may be assumed to bear 8,000 lb. per square foot. Virgin soil, undisturbed and undampened by wells or undisturbed by roots may be assumed to bear a maximum of

6,000 lb. Bearing tests in pits or trenches by loading known areas should be accepted with caution, remembering that a small area will bear a larger load per unit of area for a short time than will a larger area for an indefinite period. Considerable judgment even then is required.

Of the four papers on foundations, two related to caissons, one was on pile foundations and one on the Chicago open-well method. O. E. Mogensen, secretary, F. L. Smidth & Co., New York, described the tests and construction of open-well concrete caissons under cement silos of the new plant of the Missouri Portland Cement Co. Hardpan and fireclay encountered 40 to 82 ft. below the surface were the supporting materials. The silos were 32 and 35 ft. in diameter and the clusters of eight weighed when filled 32,620, 16,640 and 18,560 tons each. Four caissons, placed under each silo, were 8 ft. in diameter and had a 10-in. shell. They were belled out at the bottom, depending on the load, from 12 to 16 ft. in diameter. The method of sinking was the reverse operation of the construction of a monolithic tapered concrete chimney, the sectional form being kept in a stationary position at or below the ground level and the cylindrical concrete shell gradually lowered into the ground as a monolithic cylinder. A clamshell bucket excavated the material within the caisson. This work was described in *Engineering News-Record*, Dec. 13, 1928, p. 870.

Foundation Conditions in St. Louis

S. W. Bowen, Fruin-Colnon Contracting Co., St. Louis, described sub-soil conditions and caisson foundation methods in the St. Louis district. Many peculiar underground conditions were noted, such as folding, caves and boulder piles. The material above the rock often contains pockets and streaks of quicksand. On the Illinois side of the Mississippi rock is down 125 ft. and only heavy structures rest on it. To meet the condition in St. Louis a reinforced caisson has been developed which can be sunk by open-well methods, using air only where quicksand and water are encountered. Air is also used to protect adjoining buildings from the possibility of sand flowing out from under them and into the foundation shafts. To fit up a shaft for air an ordinary air lock is bolted to the top of the caisson. Water jets are used to lubricate the outside of the shell. In one case a barrel of axle grease was used and in another light charges of dynamite. The charges were put down in pipes driven along the outside of the shell, but this is done only as a last resort.

"Pile Foundations" was the subject of a paper by A. C. Everham, Raymond Concrete Pile Co., Kansas City, in which he discussed wood, precast and cast-in-place types as well as the relative merits of piles and caissons. He held there is a place for all types. Variations in results of various area pressure tests cannot be relied upon too much. He warned against tests of small area. Tests at Detroit showed twice the settlement under the same unit load on 9 sq.ft. as on 1 sq.ft. None of the formula can be blindly relied upon, in his opinion.

W. J. Newman, contractor, Chicago, described the Chicago open-well method of sinking foundations, giving many expedients used in bad ground, such as the use of a cutter head with water forced to and from it carrying the liquid mud to a sump.

M. F. Marks, University City, Mo., in discussion, explained the St. Louis condition. Including excavations, the concrete in the caissons under the Bell Telephone building cost $30 to $35 per cubic yard. T. Chalkley Hatton, consultant, Milwaukee, cited the success of the old *Engineering News* formula for piledriving which, though a "thumb and finger" gage, is still used. Difference in weight of hammer needed for wood and concrete piles needs study, according to H. Austil, Missouri & Ohio Ry., St. Louis.

Waterways Division—The Brazos River improvement, 47 miles southwest of Galveston, being a complete diversion of all flow, was described in a paper by Milo P. Fox, major, Corps of Engineers, U. S. Army, district engineer, Galveston, Tex. The problem of keeping the old mouth open was accentuated by hydraulic and physical conditions. The river has a varying slope, 0.6 to 0.44 ft. per mile, has a shifting bar at the mouth, is subject to frequent rises and carries 5 to 10 per cent by volume of silt. Six methods were proposed, but complete diversion was decided on as feasible. A dam with 110-ft. crown, 15 ft. above low tide, between sheet pile walls contains 360,000 cu.yd. of material. The dam makes a tidal basin 450 ft. wide and 25 ft. deep.

Both army engineers and civilians joined in a discussion of cutoffs. The former believe cutoffs never will be a success and the latter still hold that they give promise of success in places. E. N. Noyes, consultant, Dallas, Tex., instanced a cutoff of 8 miles in the Trinity River by a new 4.6-mile canal excavated by a pilot channel. The work was completed in 1927 and no tendency to produce bends has been observed.

Walter F. Schulz, consultant, Memphis, spoke on "Terminals on Inland Waterways." Facilities required and factors to be cared for were given. Three main types are built for (1) package freight, (2) for interchange of commodities and (3) for bulk stuff. Grain needs a separate terminal.

In discussion Baxter L. Brown, consultant, St. Louis, called attention to the excessive cost of transfer of package freight, often 40 per cent of the gross. Major Charles L. Hall, Rock Island, Ill., said that of the three factors, navigation, railroad set-up and suitable site development, the railroad set-up was the most important. He used algebraic formulas to illustrate a method for the determination of economy of barge transportation.

Aerial Surveys Discussed

Surveying and Mapping Division—Engineers of the Stone & Webster Engineering Corp., and the Union Electric Light & Power Co., located two transmission lines 138 and 122 miles long connecting the Bagnell dam to St. Louis and to Rivermines by aerial survey methods in 4½ months in a total flying time of 30 hours. The cost was $47.50 per mile. Stanley Stokes, assistant vice-president of the power company, and F. G. Dana, engineer for the engineering corporation, described the procedure, which they hold is half as expensive as the usual commercial mosaic and ground control method.

Discussion brought out differences of opinion as to the costs and the accuracy of the method employed, but Mr. Dana held that for the purpose, simply to locate a line and not to obtain a topographic map, the aerial survey without ground control other than that which existed was sufficient. The right-of-way agents claimed it made their work 50 per cent easier not to have surveyors on the ground until they had done their work. Mr. Dana felt that students should be given as much practice in aerial surveys as with a transit, but Dean O. M. Leland, University of Minnesota, disagreed, since the schools cannot make specialists but should give enough so that

the engineer would know when and how to employ specialists.

Surveying and mapping activities in connection with flood-control work of the Mississippi River were outlined by L. D. Worsham, major, Corps of Engineers, U. S. Army, assistant to district engineer, Memphis. The investigations with reference to tributaries were covered in particular. They proceed first only so far as to learn if projects are at all feasible of development into some sort of usefulness such as storage to prevent floods, irrigation, power or to aid navigation. He emphasized that the surveys were distinctly for this special purpose and utilized all existing data. This is one of the most comprehensive studies of water resources ever undertaken and covers 183 streams draining the whole area of the country except the watersheds of the Colorado and Sacramento rivers for which the work has been done. The St. Francis River report was submitted last fall. The work on the Arkansas and White rivers is nearly done. About $250,000 has been spent on the former and $130,000 on the White.

John C. H. Lee, major, Corps of Engineers, U. S. Army, district engineer, Vicksburg Engineer District, in discussion outlined similar work in his district where aerial survey methods have also been utilized. The methods used were described by George C. Clemens, one of Major Lee's assistants. The aerial work is done by contract and the mosaic maps, which are at a scale of 1 to 18,000, are subjected to ground control by the location of railroads and highway. Altogether 19,000 square miles of area will be covered. On the Red River 2,500 square miles have been mapped, as has an area of 1,500 square miles in the delta of the Yazoo River and Mississippi near Vicksburg.

Symposium on Prequalification

Highway Division—Participating in the symposium on prequalification for bidders were three speakers. Robert B. Brooks, director, department of streets and sewers, St. Louis, stated that where once used there was unanimity of favorable opinion for the method. Allan J. Parrish, general contractor, presented an extended brief on the subject, answering all objections and presenting ten favorable points. Ward P. Christie, engineer, Ulen & Co., Lebanon, Ind., said there were from 10 to 50 agencies actively interested in a low bidder as soon as he was identified, all making it difficult to determine his responsibility by the postqualification method. Engineering organizations, he claimed, had not been active in promoting the method, but he saw no reason why they should not be vitally concerned and active.

S. A. Greeley, in discussion, inquired for yardsticks as to financial ability, experience and character. Mr. Parrish indicated that the better surety companies could and would give such information. N. T. Veatch held that the great trouble was with the bonding houses, and these he felt ought to be qualified in some way. War should be waged on the incompetent bonding concerns. J. E. Root uses the prequalification method on the private work of the Cincinnati terminal and saves much time.

T. H. Cutler, chief engineer, Missouri state highway department, outlined a scientific method used in the selection of highway routes for the purpose of forming an economic, unified system. The basic principle is maximum service for a given cost. First, at each step of the process each succeeding increment of mileage should serve in its turn the largest percentage of road users. Second, with a diminishing percentage of road users there must be a limit beyond which it is uneconomic to go. That limit is the "marginal mile," which is a mile having an annual cost equaling the annual savings in operation costs accruing to the road users.

Roy W. Jablonsky, St. Louis County surveyor and highway engineer, in his paper on "County Highways" described the methods by which his county has been laying out a scientific highway system. Bartholomew & Associates, city planners, were employed to work out the system in much the same manner as a city plan is worked out. A thorough analysis of existing conditions was made and then a comprehensive thoroughfare plan was worked out based on present conditions and future traffic requirements. The highways are co-ordinated with the major street plan of St. Louis and with rapid-transit recommendations. It is hoped to prevent many costly mistakes which inevitably occur in unplanned areas.

Excursions—An unusually large number of inspection trips were arranged to see engineering in St. Louis. The results of city planning, the great River des Peres drainage improvement, waterfront, new terminals of the St. Louis Electric Co. and the municipal airport were in-town excursions. The all-day Saturday trip to the $33,000,000 hydro-electric development at Bagnell, Mo., under construction by the Union Electric Light & Power Co. and the Stone & Webster Engineering Corp. and the inspection en route of the G.E.O. track, double tracking, grade and alignment revision now under way by the Missouri Pacific Railroad Co., included perhaps the most elaborate entertainment the society has had tendered it since pre-I.C.C. days. This 150-ft. concrete overflow type of gravity dam is well along, the concrete in the spillway section being practically all in place and the 200,000-hp. power house section behind the cellular type of sheet pile cofferdams being now actively under construction. The three companies named were responsible for the trip and two meals en route.

Welded Rails and Joints

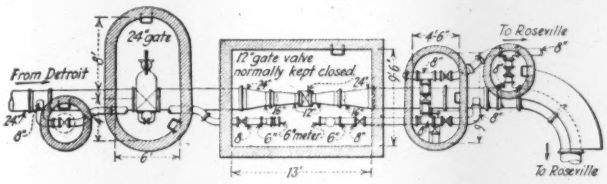
Rails electrically welded at the ends to form continuous lengths are considered to have important advantages over welded joints in which bolted splice bars are welded to the rails, according to a report to the Belgian Society of Engineers and Manufacturers by D. Rosenthal, director of the laboratory of the University of Brussels. One reason assigned is the elimination of the joint space or expansion space between the railheads, as the existence of this gap causes wear and battering of the rail ends besides resulting in wear or cutting of the receiving rail just beyond the joint, owing to the action of the wheel in jumping the gap. In tests made by Mr. Van Noordbeck, of the National Local Railways Co., this latter effect has been shown to occur even with a saw-cut made across the head of a solid rail. In addition, the elimination of bolt holes in the rails is an advantage. Tests indicate that the best arrangement is to weld the railheads together for their full depth, leaving the webs and flanges clear, and to weld the flanges of each rail to a base plate which comes between the joint ties but is not supported by them. A space of 2 in. is left, however, between the flange welds of the two rails. This form of joint construction is recommended for both T-rails and the grooved-girder rails used on tracks in paved streets.

From Job and Office

Hints That Cut Cost and Time for the Contractor and Engineer

Small Meter Used for Low Flow in Large Water Main

BECAUSE of the relatively small flow passing through the 24-in. main supplying water to the village of Roseville, Mich., a 6-in. meter is used at present to determine the total consumption, purchased from the Detroit system. Plans for the future development of the Detroit metropolitan area require a 24-in. line to serve this region, and when the water consumption



METER VAULT AT ROSEVILLE, MICH.

reaches the flow for which the line has been designed, a venturi meter will be installed. At present a gate valve is installed in the 24-in. main, bypassed by an 8-in. line in which the 6-in. meter is placed. Space has been left in the meter vault for a second bypass line and meter to be installed when the capacity of the present equipment is exceeded.

Section Modulus of Pipe Determined by Simplified Formula

By D. L. Bissell

Assistant Engineer, Bureau of Engineering and Streets, San Diego, Calif.

GIVEN the size of an iron or steel pipe carrying water or sewage, over what span will the pipe be self-supporting? This question often arises in the engineering office. Standard formulas for obtaining the moment of inertia or the section modulus, while not complicated, involve the fourth powers of the inside and outside diameters. To H. C. McCarty, of this office, is due the derivation of a simplified formula which gives the section modulus of a pipe with sufficient accuracy for all practical purposes, and also for the accompanying chart, which shows the correction to be applied when extreme accuracy is necessary.

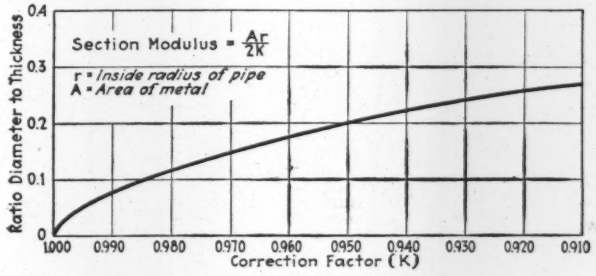
Expressing the simplified relation as a formula,

$$S = \frac{Ar}{2},$$

S equals the section modulus, A equals area of metal and r equals the inside radius of the pipe. When the thickness of the pipe is one-tenth of the diameter or less, this approximate formula may be used without correction, as the error is on the side of safety. Expressed more exactly,

$$S = \frac{Ar}{2K}$$

in which K equals a correction factor obtained from the accompanying diagram.



CORRECTION CHART FOR COMPUTING SECTION MODULUS OF PIPE

Mid-Hudson Bridge Paved in Alternate Slabs to Equalize Cable Loads

DEAD-LOAD stresses on the two suspension cables supporting the Mid-Hudson bridge at Poughkeepsie, N. Y., were equalized during the laying of the concrete pavement by a carefully planned sequence of field operations. The concrete roadway across the 3,000-ft. structure is 30 ft. wide between curbs and 8 in. thick, heavily reinforced with built-up mats of ½-in. steel rods. This pavement, together with two 4½-ft. concrete sidewalks 3

FIG. 1—DELIVERING CONCRETE IN HOPPER CAR EQUIPPED WITH FOLDING CHUTE

FIG. 2—ROADWAY OF MID-HUDSON BRIDGE, SHOWING PAVING OF ALTERNATE BLOCKS

in. thick, imposes a dead load of 4,000 lb. per linear foot on the bridge. Concrete was laid in three strips, the center one being 9 ft. 4 in. wide and the two side strips each 11 ft. 1 in. wide. An industrial railway was used to deliver mixed concrete and to handle forms and steel.

As a preliminary to the paving operation, the single narrow-gage railway track was installed for the full length of the bridge immediately alongside of the center strip. On the other side of the strip a line of form panels 4 ft. wide was placed to serve as a working platform. Wooden forms for the center strip were then placed between the I-beam stringers and concreting was done in sections 41 ft. 8 in. long, equivalent to two bridge panels. To prevent unequal loading, paving started at the center and was carried outward toward both ends. With the center strip completed, the narrow-gage track was shifted to the finished slab and paving was again started from the middle. In this case, however, alternate panels of the two outside roadways were poured, first on one side of the center strip and then on the other, leaving the staggered gaps shown in Fig. 2. These openings were then filled in alternately, so that during the entire paving operation the weight of the roadway was distributed uniformly between the two cables.

In order to expedite the work wooden form panels and steel reinforcing mats were assembled before paving was started, being placed in position by a derrick car operating on the temporary railway. Concrete, mixed in duplicate plants at each end of the bridge, was distributed by means of hopper cars hauled by gasoline locomotives. Each car was equipped with a folding chute (Fig. 1) to deliver concrete directly to the forms by gravity.

The Mid-Hudson bridge was built under the general direction of Frederick Stuart Greene, superintendent of the New York state department of public works, with L. S. Hulburd as resident engineer. Modjeski & Moran were the consulting engineers, with C. W. Hanson as representative on the work. The roadway paving was done by the Scott Brothers Construction Co., Rome, N. Y.; L. G. Litchfield, secretary, and H. M. Sherwood, superintendent, were in charge.

From Job and Office

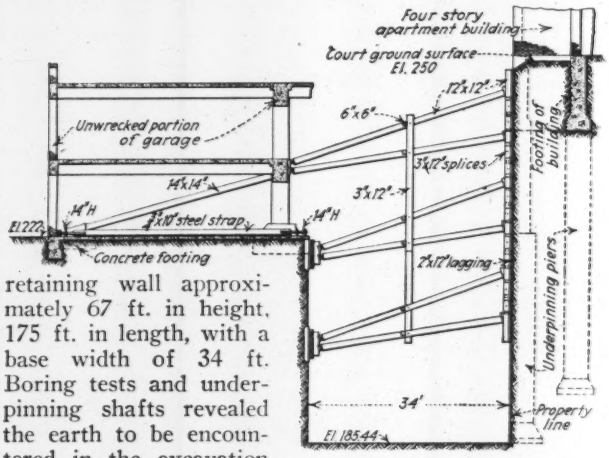
Hints That Cut Cost and Time

Heavy Shoring Braces Earth Bank During Construction of Wall

By F. M. Hines

Construction Engineer, P. J. Walker Co., Los Angeles, Calif.

CONSTRUCTION of the substructure for the new Southern California Edison building in Los Angeles on a site immediately adjacent to the Sherwood Apartments, a four-story class C building, introduced an interesting shoring problem of some magnitude. Although the weight of the apartment building itself was taken care of by underpinning the piers, to retain the earth under the building it was necessary to build a buttressed retaining wall approximately 67 ft. in height, 175 ft. in length, with a base width of 34 ft. Boring tests and underpinning shafts revealed the earth to be encountered in the excavation as a hard clay with a few strata of gravel. For design purposes the weight of this material was considered as 125 lb. per cubic foot and the angle of repose as 45 deg.



BUILDING HELPS SUPPORT EARTH BANK

Adjacent to the Sherwood Apartments on the south, and on the northerly portion of the new building site, a two-story reinforced-concrete garage was located. The dimensions of the garage and of the retaining wall were such as to evolve the scheme of wrecking only the northerly half of the garage, using the remaining portion as a support for the upper tier of shores. The second floor girder was used as a base for this shoring, stress being transmitted to the footings by yoke sets consisting of two 14-in. 171.5-lb. H-beams, a 14x14-in. timber strut, and two ¾x10-in. plate straps fitted with 3-in.

From Job and Office

For Contractor and Engineer

threaded ends. As shown in the drawing, the timber strut was placed to bear against the second floor girder, the lower end fitting into a saddle provided for it against one of the H-members. The latter was linked to the second H-member by means of the steel plates. Concrete footings were provided at the lower end of the timber strut.

The other shores, in two tiers, were placed against mats constructed of 8x8-in. timbers in double layers, drift-pinned together, and with a 12x12-in. timber across the bearing side. Directly beneath the jackplates a 2x12-in. piece of oak was placed to prevent crushing of the cross-timbers. All shores against the earth bank were 12x12-in. timbers, vertically braced with 3x12-in. timbers and horizontally with 6x6-in. struts. Lagging against the earth bank was of 2x12-in. lumber. The vertical 12x12-in. needle was designed in 8-ft. sections with 3x12-in. timber splices. This made it possible to remove one tier of shores and 8 ft. of lagging at a time, as the retaining wall concrete was poured. The shores were spaced approximately 8 ft. on centers and were so arranged as to offer no interference with the structural or reinforcing steel of the retaining wall. No support was necessary for the lower 18 ft. of the bank. A total of approximately 125,000 b.ft. of lumber was used. Deformation observations on the standing portion of the garage were made daily during the construction of the wall, the total outward deflection of the roof at four different points averaging $\frac{7}{8}$ in. Observations on the apartment building revealed no perceptible movement.

The shoring was designed by the writer under the direction of R. V. Labarre, consulting engineer, of Los Angeles, who directed the work for the P. J. Walker Co. under the supervision of Allison & Allison, architects, and the engineering department of the Southern California Edison Co.

Unusual Roof of Umbrella Type Shows Ingenuity of Early Designer

DEMOLITION of an old wire mill at the Trenton, N. J., plant of the John A. Roebling Sons Co. has brought to light a roof design which is both interesting and unique. The age of the building is uncertain, but it is known to exceed 65 years. In the design, which is thought to be the work of John A. Roebling, the problem was to provide a roof 80 ft. square with but one supporting column in addition to the four building walls. To do this, a cast-iron column was erected in the center of the building, forming an X in cross-section, and given the appearance of being circular by filling in with four oak segments. Iron bands placed about 3 ft. apart bound the oak fillers to the column. This column supported the ends of eight wooden trusses extending to the four corners and four sides of the brick building. Iron rods radiating from the center column, and fastened by clevises to a ring around the column, were used to reinforce the trusses. Details of the construction are shown in Fig. 2.

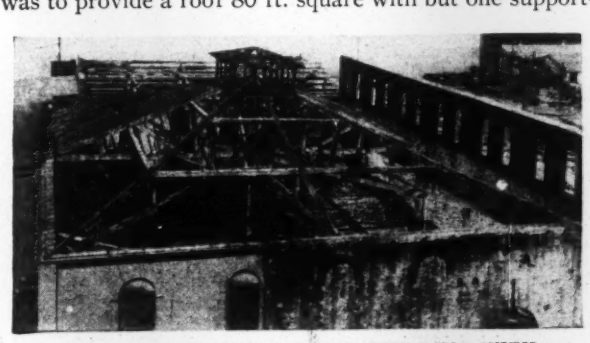


FIG. 1—DEMOLISHING BRICK BUILDING WITH UNUSUAL ROOF CONSTRUCTION

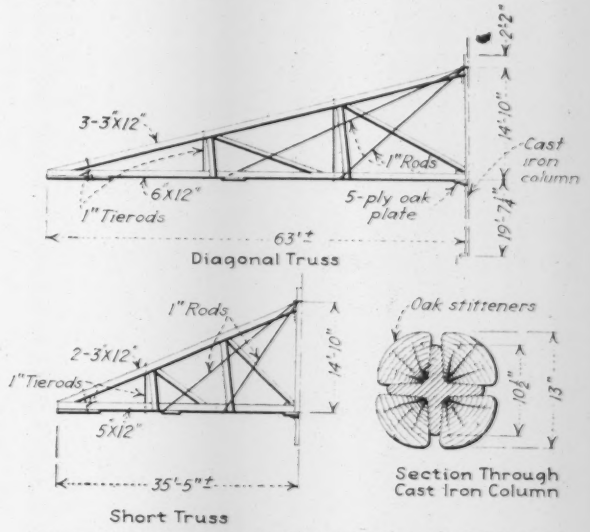


FIG. 2—DETAILS OF UMBRELLA-TYPE ROOF TRUSSES

Job and Office Notes

TIMBER LAGGING was used to reduce friction in a pipe-jacking operation under a railway embankment at Jefferson City, Mo., in which 156 ft. of 36-in. water pipe, used to supply condensing water for the Jefferson City plant of the Missouri Power & Light Co., was jacked under an embankment carrying ten lines of track. The lagging consisted of 2x4-in. lumber laid parallel to the pipe axis and held in place by iron straps.

MOST DRAFTSMEN would consider it very simple to lay out rectangular sheets 20x28 in. An examination of a number of such sheets, however, showed very few to be perfect, and many as much as 0.1 in. in error. In attempting to square these up, the following simple and accurate method was developed: The diagonal of the desired rectangle was computed and found to be 34.40 in. A beam compass was carefully set to give a circle 17.20 in. in radius. One 28-in. side of the rectangle was measured, and any existing error corrected. From each end of this base arcs were struck, intersecting at the center of the rectangle. From this center, arcs were struck at the remaining two corners of the rectangle, and the corner points detemined by projecting from the opposite corner through the center point, to an intersection with these arcs. The rectangle thus laid out has its sides exactly the correct length, and all four angles are right angles.

—HERBERT N. BRADSTREET, *Duarte, Calif.*

CONSIDERABLE ERROR in reading a level rod may be caused by the practice of rocking the rod when the cross-hair intersection is near its lower extremity. To avoid this error entirely would call theoretically for a chisel edge at the bottom of the rod, which is impracticable. Satisfactory results with less error can be obtained by beveling the foot of the rod so as to leave a bearing surface about $\frac{1}{4}$ in. wide, perpendicular to the line of sight.

Another frequent source of error in leveling, especially in concrete formwork, is the practice of marking an elevation on a vertical surface and then driving a nail at the point mark upon which to rest the foot of the rod. This introduces an error equal in amount to half the diameter of the nail head. Cutting a groove and slot of the proper depth in the base of the rod will obviate this error and yield greater accuracy in construction work.

—G. GOODWIN, *Ottawa, Ont.*

Letters to the Editor

A Forum for Discussion of Views of Engineers and Contractors

Mississippi Contracting Practices Defended

Sir—There has come to my notice an article in *Engineering News-Record* of Sept. 18, 1930, entitled "Force-Account Levee Construction a Disruptive Policy." In the same issue under the heading "Serious Charges" is an editorial based on the above-named article.

The seriousness of the charges is much softened in the opinion of one who knows that Mr. Lineberger, the author of them, is not only the assistant to the president of the Standard Dredging Co., as he signs himself, but also is the assistant to the president of the Orleans Dredging Co., and is presumably its "Washington representative." I notice that he has free access to the Chief of Engineers, who frequently hears his representations, and I believe that he also has access to most of the various sources of authority in Washington, legislative and administrative, for a hearing of any charges that he wishes to make.

The Orleans Dredging Co. has several large contracts for levee work on the Mississippi River, and due to faulty work and lack of progress, it has recently been necessary to take away portions of this work and give them to another contractor.

For the time being I believe that nobody will be interested in going further into the serious charges that you mention.

It may be well to inform you that of all the levee work now being done on the Mississippi River, 84 per cent is in the hands of contractors, and the chances are that in future a still larger percentage will be found there. The work is going on quietly, efficiently and at satisfactory prices. The specifications for such work may be open to criticism in minor particulars, but I have not heard of any criticism directed at the quality of the work demanded. The great body of efficient contractors on the river will, I believe, meet and overcome the difficulties.

When inferior work is permitted with funds given by the people at large for the protection of those citizens who have to live behind earthworks in the Mississippi Valley, then there will be a basis for serious charges, particularly so if the inferior work is permitted so that an individual contractor may reap profit therefrom.

In the charges that you have noticed as serious, improper motives have been insinuated and attributed to a large body of faithful public servants, who are working under my temporary direction. They are endeavoring as best they may to see that the public gets full value for every dollar that is intrusted to their care. I am taking the time in writing this letter to secure as much protection for them as possible against the attacks of the self-interested as opposed to the public interest.

LYTLE BROWN,
Major General,
Chief of Engineers.

Washington, D. C.,
Sept. 26, 1930.

From a Wearer of the Pin

Sir—In your Sept. 18 issue, p. 468, is a letter from one who signs himself "Traveler"; in this letter he expresses some rather unusual views on the wearing of the society pin by civil engineers, views startling enough to warrant serious consideration.

If "Traveler" is a member in some grade of the society referred to, surely he would not spread the impression that he became so merely by the payment of dues! Has he forgotten the years of study and toil which qualified him for admission and maybe transfer later to a higher grade? Has he compared the requirements for admission to corporate membership in the Am.Soc.C.E. with the eligibility rules of the Phi Beta Kappa which he mentions in comparison?

What "Traveler" says about the impression which the wearing of the society pin by a civil engineer would or might have upon a prospective employer is food for thought. There are many civil engineers who employ other engineers; I wonder if they, too, are prejudiced against an employee who wears his pin; and if so, why?

I consider my own pin a hard-won trophy; I am proud of it and wear it. I wear it as a trophy awarded me by impartial judges on demonstration of diligence, experience and proof of ability. I believe that I have much less the same feeling in regard to my society pin that my younger brother has toward his Phi Beta Kappa key, which he wears constantly. Perhaps many agree with "Traveler" in his frank expression, but it is true that many do not, as evidenced by the number of pins worn.

Appreciation and recognition by the public of doctors, lawyers and architects may be due to many things; certainly it is due in part to definite rules and customs of ethics, and their observance—sometimes their enforcement. Until engineers themselves, not only individually but as a profession, personally observe and respect the ethics peculiar to them as professional men, the public is not likely to provide them with pedestals. With the present trend toward stiffening the requirements for society admission and transfer, and with the recent show of teeth by the society on the subject of unethical conduct by its members, I believe civil engineers are moving in the direction of recognition. They have a long distance to travel, by reason of past laxity.

If that part of the public which now employs civil engineers is of the opinion that membership in the society is a questionable recommendation, or even a warning against that individual, it is not enough to stop wearing the pin; the engineer should resign, or withdraw from the society, and do it quickly! If membership in the Am.Soc.C.E. is a professional liability instead of an asset, that is one thing; if an engineer may be a member with impunity but must not "wear his colors," that is another thing. If by the wearing upon his person of the society pin the civil engineer not only lowers his standing in the community but actually raises a barrier against his own employment in professional capacity, surely it is timely warning to engineers in general, and to civil engineers in particular, that has been given by "Traveler."

In this writer's opinion, our friend has raised a question more far-reaching than casual reading discloses. For that reason we should like to see something more definite in the way of proof that the wearing of the pin is an indication of an inferiority complex.

GEORGE C. STONE,
Consulting Engineer.

Danville, Va.,
Oct. 1, 1930.

Shortest Railroad in Canada

Sir—May I suggest that in your issue of Sept. 4, 1930, on p. 381, where, under the heading "Shortest Railroad in Canada Is Junked," you award that distinction to the Fort Erie, Snake Hill & Pacific, you must have overlooked the existence of the Huntsville & Lake of Bays Navigation Co.'s railroad. This road, about 1¼ miles long, equipped with steam locomotives, passenger, baggage and freight cars, runs on schedule time between terminal stations on the shores of Peninsula Lake and Lake of Bays, respectively, and carries a considerable amount of traffic during the summer months. And better still, there is not any immediate or remote idea of its being junked.

HARRY ETCHES.

Ottawa, Ont.,
Sept. 19, 1930.

Asphalt Plant in St. Louis

Sir—In the Sept. 4 issue of *Engineering News-Record*, p. 377, you have an article on a rotary pressure asphalt mixer. In the final paragraph there is a statement that the machine will mix eight or nine 5-ton batches *per day*. That would make a total output of only 40 to 50 tons per day. Is this an error? If not, then it would appear that the machine would have very little demand.

R. D. KNEALE,
With Sam E. Finley.

Atlanta, Ga.,
Sept. 10, 1930.

The statement is incorrect. It should read "eight or nine 5-ton batches per hour."—EDITOR.

News of the Week

Dynamited Red River Bridge to Be Rebuilt

An agreement has been reached between officials of the Arkansas state highway department and the Kansas City Bridge Co. whereby that company will immediately begin to rebuild the center span of the Garland City bridge across Red River which was destroyed by dynamite on Sept. 3, as told in *Engineering News-Record*, Sept. 11, p. 431. No agreement was reached as to settlement of the loss involved, the highway department insisting that the bridge should be completed and turned over to the state before it would consider a basis for sharing the loss.

No part of the dynamited span will be used for reconstructing the central span. The bridge company will have to ship all its equipment back to the site, as barges, tugs, derricks and other equipment had been removed several weeks before the bridge was dynamited. Damage has been estimated at from $150,000 to $250,000. Several months will be required to rebuild the span.

Highway officials stated that their investigation has not fixed the responsibility for the crime.

Constitutionality of Boulder Canyon Dam Act Is Challenged

Arizona Asks Leave of Supreme Court to File Bill of Complaint Against Project

LEAVE to file a bill of complaint in the name of the State of Arizona was asked of the U. S. Supreme Court on Oct. 6 by the state's attorney-general, in which it is charged that the Colorado River Compact is "grossly inequitable and unfair" and that the Boulder Canyon project act is unconstitutional.

The bill of complaint alleges five grounds of unconstitutionality:

1. It attempts to discriminate against the State of Arizona in favor of the State of California by providing that the water to be stored in the reservoir shall be delivered without charge for use in the Imperial and Coachella valleys of California, whereas all the water users in Arizona are required to pay for their water according to such charges as the secretary of the interior may prescribe.

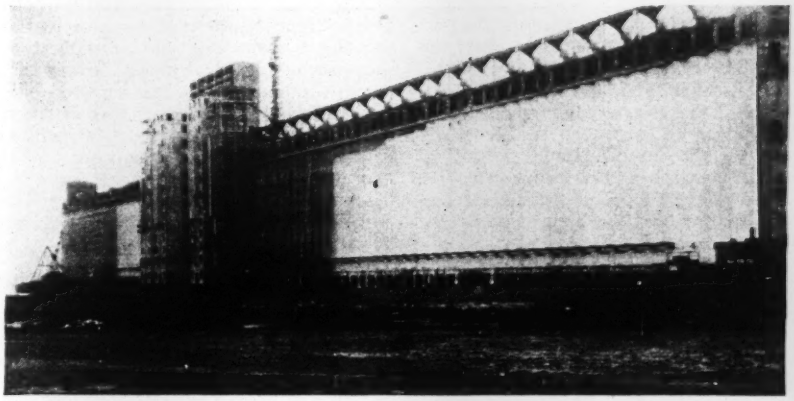
2. It attempts to deprive Arizona of its sovereign jurisdiction and control over its water and other natural resources.

3. It attempts to subject the state to the Colorado River Compact and to enforce it and make it effective against Arizona, notwithstanding that that state has never ratified or approved it.

4. It authorizes the secretary of the interior to construct, operate and maintain a dam and reservoir in the Colorado River at Black Canyon to store 8,000,000 acre-ft. of water, all of which is now subject to the authority of Arizona.

5. It authorizes the secretary to engage in the business of storing and selling water, generating and selling electrical power, and of leasing water and equipment for the generation of the power, with the result that the state will be deprived of its resources and its right to levy taxes on these businesses.

Power to do none of these things, it is contended, has been granted to Congress by the Constitution.



CANADA PREPARES FOR WELLAND SHIP CANAL OPENING

In anticipation of the opening of the new Welland Canal, which will make it possible for the big grain boats on the upper Great Lakes to come down through Lake Ontario, the Canadian government is building a 5,500,000-bushel grain elevator at Prescott, Ont., on the St. Lawrence River. Prescott lies opposite Ogdensburg, N. Y., near the head of the rapids section of the St. Lawrence. It is expected that lake boats will come down to this port and unload their cargoes for transfer either to railroad cars or to smaller boats capable of navigating the St. Lawrence River canal. A slip about 1,300 ft. long has been dredged at one side of the elevator shown herewith to make it possible for two lake boats to unload at one time. Four movable marine legs, shown in the illustration, are to be used for unloading the large vessels. Smaller vessels will be loaded on the opposite side of the elevator, and freight cars may be loaded or emptied at the inland end of the elevator, not shown in the illustration. Rail connections are provided to both the Canadian National and the Canadian Pacific railways. The elevator is being built by the department of public works, with L. deB. Roy as resident engineer in charge. Atlas Construction Co. is general contractor and C. D. Howes & Co. consulting engineers.

Scaffolding Fire Damages New Building in Harrisburg

Fire in the auditorium of the new state education building at Harrisburg, Pa., on Oct. 3 damaged the $4,000,000 structure to a considerable extent. Although no authoritative estimate of damage was made public, it is stated that the greater portion of the structure, except structural steel and exterior stone work, will require reconditioning. The blaze was discovered at 4 a.m. in a large amount of inflammable scaffolding which was being used by men decorating the walls and ceiling of the auditorium. Much of the damage to the building, which was to have been completed in December, was caused by smoke and water.

Approval Granted to Part of New York's Sewage-Disposal Plant

The New York City board of estimate and apportionment on Oct 3 voted formal approval of construction of two sections of the $17,800,000 Ward's Island sewage-disposal plant. Bids for these sections, which will cost between $7,000,000 and $8,000,000, will be called for by the sanitation commission about Dec. 15. When completed, the plant will have a capacity of 180,000,000 gal. of sewage daily from the boroughs of Manhattan and the Bronx. The cost of the plant will be borne by the city of New York at large, to be levied in five annual installments.

George Westinghouse Memorial Unveiled in Pittsburgh

A memorial to George Westinghouse, inventor and industrial leader, was unveiled in Schenley Park, Pittsburgh, on Oct. 6. The memorial was designed by Henry F. Hornbostel, assisted by Eric Fisher Wood, and it was their intention to create a work thoroughly modern in character, typically American in spirit, and that would convey to the spectator a feeling of veneration for the genius whom it commemorates.

The monument itself stands upon a base of Norwegian granite, a jet black stone with embedded crystals of feldspar which gleam blue where the light strikes them. Its principal component is a large central panel flanked by two semicircular wings, all of which are made of gold-leafed bronze with Norwegian granite insets. The central panel carries the medallion of George Westinghouse supported on an openwork background of oak tree foilage, and on either side are two figures, one a skilled mechanic and the other an engineer with his slide rule. Both the portrait and the figures are modeled in full relief. At the bottom of the central panel is a memorial of the most important period of Mr. Westinghouse's career—a representation of the first train to be equipped with the Westinghouse airbrake.

Each of the flanking wings is divided into three panels, and on each panel is depicted in low relief one of Mr. Westinghouse's achievements. These include the illumination of the Chicago World's Fair of 1893 by the alternating current system developed by Mr. Westinghouse; the hydro-electric plant at Niagara Falls with the 5,000-hp. alternating current electric generators which were supplied by Mr. Westinghouse and were at that time the largest in the world; the steam turbine, introduced into America by Mr. Westinghouse; alternating current railroad electrification, which Mr. Westinghouse advocated and made practicable; the airbrake, the most famous of all Westinghouse inventions; and railroad switching and signaling systems, another of the inventor's important contributions to the railroad industry. These panels were executed by Paul Fjelde.

Standing well back of the panels and facing the memorial is a figure typifying American Youth. This figure, modeled by Daniel Chester French, is of heroic size and is of gold-leafed bronze to correspond with the rest of the memorial. The youth carries his schoolbooks in one hand and in the other his cap, removed in reverence and crumpled in his fingers.

The memorial was made possible by the contributions of 55,000 employees of the industries founded by Mr. Westinghouse. Their names have been inscribed upon a document which has been placed in a hermetically sealed compartment at the back of the monument.

Engineer's Fees From State Held Subject to U. S. Income Tax

The U. S. board of tax appeals has ruled that H. A. Underwood, who was engaged during 1924 and 1925 to render engineering and architectural services to the State of North Carolina, was not an employee of the state and that his commissions were not exempt from tax.

The opinion reveals that commissions and fees received by Underwood from North Carolina in performance of services of state institutions for the fiscal years ended Feb. 29, 1924, and Feb. 28, 1925, amounted to $68,080 in the former year and $44,666 in the latter. These covered his salary, office expenses and cost of securing assistants. The commissioner of internal revenue held that these amounts were income subject to tax. An appeal was taken to the board, which sustains the commissioner.

Last Obstacle to Pend Oreille Dam Is Removed

In connection with its plan to develop power on the Pend Oreille River in British Columbia, the West Kootenay Power & Light Co. has finally decided to construct a single dam 400 ft. high. Engineering examinations now nearing completion have convinced the company that the big dam project is feasible. The original plan was for a two-dam development. The last obstacle in the way of the development has been removed by the action of the Reeves-Macdonald Mining Co. in withdrawing its application for power rights on the Pend Oreille. The mining company is now applying for power rights on the Salmon River, tributary of the Pend Oreille.

The West Kootenay company's dam will stand near where the Pend Oreille empties into the Columbia and will impound the entire flow of the river back to the international boundary. The output will be about 300,000 hp., a large part of which will be used by the Consolidated Mining & Smelting Co. for its new fertilizer plant at Trail.

Five Killed by Collapse of New York Building

Sudden collapse of an old four-story brick dwelling house at 15 Greenwich Ave., New York City, early in the morning of Oct. 2 resulted in the death of five persons and the injury of nine others. The accident occurred without any warning while most of these in the building were asleep. An investigation is being conducted by the district attorney's office, which has arrested officers of the Fine Wrecking Co., engaged in demolishing an adjacent structure. The president of the company maintains that during this operation all rules of the building department were complied with and that the work was supervised by city inspectors.

WESTINGHOUSE MEMORIAL IN SCHENLEY PARK, PITTSBURGH, PA.

Smaller Bond Issue to Go Before Los Angeles Voters

Two proposed bond issues totaling $13,300,000 will be submitted to the voters of Los Angeles, Calif., at the Nov. 4 election. If approved, the proceeds of one issue, for $11,000,000, will be used for additions and improvements to the municipal distribution lines, plants and stations in the city, and the other, for $2,300,000, is for preliminary work and rights of way for the proposed transmission line to the Boulder dam.

The original plan of the Los Angeles bureau of water and power commissioners was to place on the ballot a $19,000,000 bond issue to help defray the cost of a three-year construction program for power development. The total cost of the program was estimated at $31,000,000, the difference between that amount and the bond issue to be made up from power revenues.

Committee Named to Measure Unit Stresses on Lumber

The appointment of a subcommittee on unit working stresses for lumber and timber is announced by Robert P. Lamont, secretary of commerce and chairman of the national committee on wood utilization. The establishment of this board is a result of a request made by the lumber industry to the national committee to meet the demand of engineers, architects, builders and others for reliable working stresses. Members of the subcommittee are:

Chairman, F. O. Dufour, consulting engineer, United Engineers & Constructors, Inc., Philadelphia; Morris Brooks, chief, bureau of building inspection, Philadelphia; Clement E. Chase, consulting engineer, Philadelphia; C. C. Cook, maintenance engineer, Baltimore & Ohio Railroad, Baltimore; John Foley, assistant purchasing agent, Pennsylvania Railroad, Philadelphia; J. N. Pease, director, Lockwood Greene Engineers, Inc., New York City; G. J. Ray, chief engineer, Delaware, Lackawanna & Western Railroad, Hoboken, N. J.; W. A. Slater, director, Fritz Engineering Laboratory, Lehigh University, and Morton O. Withey, professor of mechanics, University of Wisconsin.

Drought Aids Conowingo Work

Because of the unusual low water in the Susquehanna River the power plant at Conowingo is shut down during off-peak hours. As a result the river bed below the dam is now exposed and it is possible to complete the work of dressing the river bed below the spillway, work which could not be carried out at the time the dam was built on account of high water.

The shut-down of the plant and the presence of workmen in the river bed started a report that the dam had been found to be defective. This report has been emphatically denied by the Philadelphia Electric Co.

Closure Made on 1,652-Ft. Kill van Kull Steel Arch

On Saturday, Oct. 4, at 4 p.m. the two arms of the 1,652-ft. steel arch span of the Kill van Kull bridge being erected between Bayonne, N. J., and Staten Island, New York City, were joined and swung free from their falsework bent supports. With the lower chords thus joined, the most important erection operation has been safely accomplished, and after the closing top chord member is inserted, some time this week, completion of the bridge will be a routine matter. Steel erection began in January of this year, so that progress has been remarkably rapid.

The Kill van Kull arch is by far the longest arch yet erected on falsework bents. It is also notable because the closure joint was located seven panels beyond the center of the arch, a requirement made necessary by the location of a ship channel near one shore in which no falsework could be placed. The erection scheme followed was to cantilever successively from steel bents placed and released as erection progressed.

At the time of closing one side consisted of an anchor arm and cantilever arm each 289 ft. long, while on the opposite side the anchor arm was 661 ft. long and the cantilever arm 413 ft. long. Closure was made on an 8-in. diameter pin in the lower chord of each truss.

On account of subnormal temperatures at the time of closing, the initial gap between the two arms was about 12 in., considerably more than expected. However, the carefully planned closure mechanism—namely, jacks in the top of the falsework bents—functioned perfectly. In about 24 hours, elapsed time and in less than half that of actual working time, the gap was closed and the bents were released. An article describing the erection and closure work in detail will be published in these pages in the near future.

The Kill van Kull bridge was designed by and is being erected under the supervision of the Port of New York Authority as a toll highway structure. The American Bridge Co. is the fabricator and erector.

General Electric to Erect Million-Dollar Building at Pittsfield

Plans for a new manufacturing building to cost $1,000,000 to be erected at the Pittsfield plant of the General Electric Co. immediately, have been announced. The structure will be devoted exclusively to the manufacture of transformer tanks and when completed will be, it is said, the largest transformer tank shop in the world. It will be more than 550 ft. long, 150 ft. wide and 70 ft. high and will be of all welded construction.

Present construction plans provide that the entire building will be built of steel and glass on a concrete foundation. No brick or timber will be used. More than 1,500 tons of structural steel will be utilized. There will be 32,000 panes of glass, all set in steel sash. Welded steel pilasters will be used instead of the conventional brick type. The roof will be a welded blanket of insulated steel, covered with a waterproof compound.

SEVEN SISTERS FALLS HYDRO-ELECTRIC DEVELOPMENT

At Seven Sisters Falls, Manitoba, the Northwestern Power Co. is constructing a hydro-electric plant which is expected to come into operation in 1931. The site is on the main channel of the Winnipeg River immediately above the mouth of the Whitemouth River. The works consists of a power house, sluice gates and spillways across the bed of the river connected by non-overflow sections to the main banks of the river on each side. The main works are of reinforced concrete and connect with low dikes which parallel the river banks for some distance. These dikes are made necessary by the fact that for about 4 miles upstream the general elevation of the country is low and without them flooding would be extensive. The ultimate installation planned will consist of six units of 37,500 hp. each, operating under a head of 66 ft. and utilizing the complete flow of the river.

Banking House and Construction Company Affiliate

Arrangements have been made for the affiliation of Ames, Emerich & Co., investment banking house, and Ulen & Co., engineering, management and construction company, it is announced. There will be no merger of the two organizations, each company retaining its separate identity and continuing under the same executive management as previously, without change of policy. This affiliation, it was stated, takes advantage of the mutually complementary businesses of the two organizations.

Commission Declares Water Power Not a Property Right

The energy which resides in falling water is not a property right appurtenant to the riparian lands, according to a recent decision of the railroad commission of Wisconsin. Under the Wisconsin water-power law, permits for the development of power upon the streams of the state must be obtained from the railroad commission. According to the law, the railroad commission, prior to the time of granting a permit to develop power, must place a value upon the dam site and the flowage right so that if, at the end of 30 years, the State of Wisconsin or any municipality wishes to exercise its rights to purchase the development, the price paid shall be the cost of reproduction of the structure less depreciation plus the valuation allowed for the dam site and flowage rights prior to the granting of the permit. The developing company by accepting this permit waives all rights to further compensation.

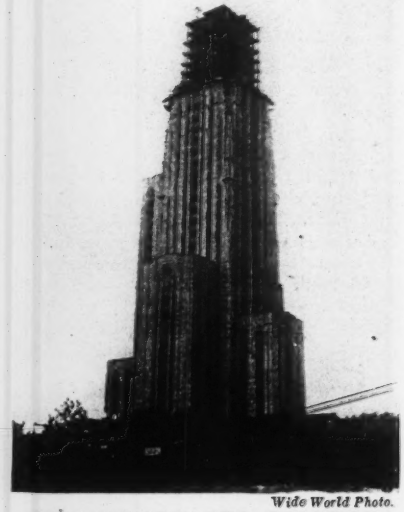
In former years, in setting value upon such dam sites and flowage rights, the commission had allowed values for the theoretical horsepower available at the site running up as high as $107 per horsepower. However, in recent years there has been a tendency on the part of the commission to reduce the value allowed for the horsepower available at the site. Now, in approving the application of the Flambeau Power Co. for a permit to construct a dam across the north fork of the Flambeau River near Park Falls, the commission says:

"The commission has valued the dam site and all flowage lands, and all other flowage rights and property necessary for the purpose set forth in the application for the permit, whether the same or any part thereof is owned by the applicant or not, and has found the value thereof rendered ready for use to be the sum of $26,000.

"Lands owned by the applicant company but not necessary for the developed project—that is, land other than flowage lands and those upon which the dam, power house and other necessary structures are to be located—are not included in the above value. Neither has the commission made any allowance for the undeveloped water power, exclusive of the value of the lands.

"The commission states as its opinion that the energy which resides in falling water and which cannot be captured except by means of a dam across the stream is not a property right appurtenant to the riparian lands, but is appurtenant to the dam which can only be constructed by permission from the state."

This theory is a radical departure from that previously held by the commission.



Wide World Photo.

THE SKYSCRAPER COLLEGE

This 40-story building is being erected for the University of Pittsburgh, and has been named the Cathedral of Learning. It will house the classrooms, lecture halls and laboratories of the university. The ground plan of the structure is approximately 333x 250 ft., and the tower is 80 ft. square. The building was conceived by Chancelor John G. Bowman as a symbol of the spirit and achievement of the steel city. The Stone & Webster Engineering Corporation is manager of construction, and the architect is Charles C. Klauder, of Philadelphia, with whom is associated H. G. Balcom, of New York, who designed the steelwork.

Flood Survey Board Named by Utah Governor

The problem of making Davis County and other parts of Utah safe against flood damage is being investigated by a commission of engineers and others appointed by Governor Dern. The governor named Sylvester Q. Cannon, formerly city engineer of Salt Lake City, as chairman of the commission.

In a letter outlining the purpose of the new commission, Governor Dern said: "I believe it is important to have a thorough and dependable survey made by a group of competent experts and practical men to ascertain whether any flood-prevention measures are feasible. Such a study must necessarily include the cause of the floods as well as the remedies."

Advisers Named to St. Lawrence Power Commission

John P. Hogan and John Bauer have been named technical advisers on problems of marketing and power distribution to the St. Lawrence Power Development Commission of New York State. Details of a study to be made by the commission were published in *Engineering News-Record*, Oct. 2, 1930, p. 546. John P. Hogan is a member of the consulting engineering firm of Parsons, Klapp, Brinckerhoff & Douglas, New York. From 1920 to 1923 he served as executive head of an investigation of the water-power resources of New York State conducted under the direction of William Barclay Parsons. Since then he has specialized in power development. Mr. Bauer, formerly professor of economics at Princeton, is a public utilities rate expert.

California Retiring From Delhi Irrigation Project

California is retiring from its state-aid land settlement program by means of an adjustment program mutually acceptable to the 232 contractor holders of the Delhi Colony and the state administration. Under this program of readjustment, which is now in process of consummation, the state's unrecoverable costs, exclusive of interest, will approximate $2,000,000, according to announcement of G. H. Hecke, director of the California department of agriculture. This is in accordance with the settlement program accepted by nearly 100 per cent of the settlers and approved by the state land settlement board.

The Delhi colony consists of 8,400 acres; 4,400 acres are sold under colony contract. The state eventually is expected to sell the remaining 4,000 acres, of which a considerable portion has reverted to the state after former sale, according to C. W. Cleary, chief of the division of land settlement.

California has two state-aid irrigation projects. The one at Durham, in the Sacramento Valley, was the first to be started and had the advantage of good soil. It was the more successful of the two colonies, but adjustment to permit the state's early withdrawal from participation in the Durham colony affairs is now under discussion.

The state entered the business of supervising and controlling the two colonies in 1917 with a legislative appropriation of $260,000, which two years later was increased by $1,000,000 and in 1921 by a second $1,000,000. Another generous appropriation was made in 1925, but by Aug. 1, 1927, the Delhi settlers owed the state $1,300,000 in principal and interest. Many of the settlers had defaulted on their contract payments, feeling against the state on the part of settlers was pronounced, and it was then decided that the state should withdraw from the land settlement business.

As the debt, collectively and individually, appeared to be beyond the ability

of most of the Delhi settlers to pay, the chief task of the land settlement division has been to find a basis for adjustment as nearly fair to the colonists and state alike as widely divergent individual conditions and the interest of the taxpaying public made possible. The adjustment program now nearing completion will relieve the state of the necessity of continued administration for the next fifteen or twenty years of a project proved to be unsatisfactory to both colonists and state.

Approval Sought for Pine Canyon Dam Project

Formal application of the city of Pasadena for approval of its Pine Canyon dam project has been made to federal and state authorities by Samuel B. Morris, chief engineer-superintendent of the municipal water department. Since the passage of the $10,000,000 bond issue in June of last year for the development of water in San Gabriel Canyon, the Pasadena city engineering forces have been working on the plans looking to the construction of a high dam at the Pine Canyon site, and for construction of an aqueduct line which will bring water to Pasadena to supplement the city's present supply, which is declared gradually getting less as the water levels recede.

It is proposed to construct a dam to be 295 ft. above streambed, or 375 ft. above its lowest foundation, while the aqueduct will be 17.8 miles long and will lead to the Sunset reservoir in Pasadena. The dam would impound 64,200 acre-ft. of water, furnishing an annual yield of 25,700 acre-ft., which, combined with the present supply, would give Pasadena 34,300 acre-ft., an amount estimated to be sufficient for a city of 200,000 population.

Ultimately it is expected that the Metropolitan Water District of Southern California will use Pasadena's reservoir site for storage of Colorado River water, which is to be brought to cities of the water district with the construction of the Boulder Canyon dam and the Metropolitan Water District aqueduct.

Pacific Coast Uniform Building Code Widely Adopted

Up to the first of October 84 cities and towns in twelve states had adopted the Pacific Coast uniform building code. These communities range in population from those of 1,000 up to cities the size of Dallas and Houston, Tex.

The code, for the development of which the Pacific Coast Building Officials Conference is responsible, has been in actual operation nearly four years. Alhambra and Sacramento, Calif., the first and second cities to adopt it, on Jan. 7, 1927, and Jan. 13, 1927, respectively, enacted the preliminary draft of 1926, as did half a dozen other cities. A 1927 edition of the code was published early in 1928. Following its publication, all of the cities but two readopted the newer edition, using the simple and inexpensive method of adoption by reference, which is legalized in California.

The 1930 edition of the uniform building code was published early in June of this year and has already been adopted by six cities, and readopted by a considerable number of cities which adopted one or both of the previous editions. Adoption of the 1930 edition is also under consideration at the present time in at least 25 cities and towns of various sizes and in many parts of the United States.

With the purpose of using the Pacific Coast uniform building code as the basis for a building code for the New England States, 49 committees of the New England Building Officials Conference, of which Edward W. Roemer, supervisor of construction, Boston, Mass., is president, are now at work reviewing it.

Traction Plans for Chicago Well Under Way

Transit problems of Chicago and the plans now under way for increasing the capacity of the rapid transit system were described by Major R. F. Kelker, Jr., chief engineer of the Chicago Transportation Committee, in an address before the Western Society of Engineers on Sept. 22. The traction ordinance, approved by the voters on July 1, 1930, as described in *Engineering News-Record* of July 10, 1930, p. 71, provides for a consolidation of the present companies operating surface lines and elevated lines. By its terms the companies were given 120 days to effect the consolidation authorized. When the formation of the new company is completed and operating arrangements are agreed upon, the city will be in a position to carry out its portion of the construction program.

Construction being given immediate consideration by the city includes a 2-mile four-track subway through the loop in State St. Additional terminal facilities will be provided by a subway structure to be built in Dearborn or Clark St. parallel to State St., connecting with new rapid transit lines running to the northwest and southwest at its extremeties. The ordinance provides for extensions of the present surface lines by the construction of 300 miles in the next ten years, one-half of which must be by rail and the remainder may be by either trackless trolley or bus.

The immediate completion of detailed plans and inauguration of the construction program is delayed by failure to date of the consolidation plan to be effected and the consequent absence of a legal operating agreement between the city and the new consolidated company. With the experience before them of Philadelphia and New York in building completely a rapid transit system before having reached an agreement with the only available operator, the Chicago traction engineers are withholding the contracts until complete and legal operating agreements can be made. The plans of the traction committee were started on July 6 and the engineers have now completed the general ordinance plan for the first section, which is to be passed on by the board of advisory engineers, by legal counsel and by the transportation committee.

Financing of the subway construction is to be by special assessment on the properties benefited, as far as possible. The traction fund, formed by the contributions of the present operating companies under the terms of the 1907 ordinance, contains $60,000,000 at present, but it is not intended that this fund should be depleted for subway construction. It is to be held for possible use in the future and added to by the 3 per cent of gross receipts from the new consolidated company.

Structural Steel Convention at Pinehurst, N. C.

The program for the annual meeting of the American Institute of Steel Construction to be held Oct. 28 to Nov. 1, at the Carolina Hotel in Pinehurst, N. C., has just been announced. James A. Farrell, president, United States Steel Corp.; E. W. Beatty, president, Canadian Pacific Railway Co., and E. P. Thomas, vice-president, United States Steel Corp., are announced as speakers at the annual banquet on Oct. 30.

The papers to be presented will cover not only the problems of the steel industry itself but some of the broader engineering problems as well. Among the latter are two papers, "Economics of Highway Bridge Construction," by T. W. Dodd, St. Joseph (Mo.) Structural Steel Co., and "Bridge Construction," by P. J. Freeman, of the bureau of tests of Allegheny County, Pittsburgh, Pa. J. E. Greiner, consulting engineer, of Baltimore, Md., will discuss the economics of highway bridge construction, and Edward W. Stearns, assistant chief engineer, Port of New York Authority, will present a film showing erection work on the Fort Lee Hudson River suspension bridge.

Some of the papers dealing with industry problems are as follows: "The Structural Steel Industry and Its Future Possibilities," by R. I. Ingalls, Ingalls Iron Works Co.; "Economic Business Conditions and Their Relation to the Structural Steel Industry," by Frank Parker, professor of finance, Wharton School of Finance and Commerce; "Why Structural Steel Should Be Nationally Advertised," by J. G. Shryock, chief engineer, Belmont Iron Works; "Code of Trade Practice and Its Enforcement," by R. B. Thomas, counsel to the committee on code of trade practice; "What I Saw and Heard in Europe," by George E. J. Pistor, Hay Foundry & Iron Works; and "Promoting Steel Consumption in Germany," by Otto von Halem, director, German Steel Syndicate. On Friday morning C. O. Hadley, secretary, trade research bureau, Pittsburgh, Pa., will give an address on "The Value of Research Being Conducted by the Trade Promotion Bureau of the United States Steel Corporation and Its Relation to the Work of the Institute."

Public Utilities Commission Proposed for San Francisco

By a vote of eleven to five the San Francisco board of supervisors has approved a charter amendment creating a public utilities commission, and this amendment will be submitted to the voters at the Nov. 4 election. The main features of the amendment are:

Commission shall consist of three members holding office six years at salaries of $6,000 each, terms of office to be staggered.

First members shall be appointed by the mayor. They will draw lots to determine who shall hold the different terms. Successor thereafter shall be elected. First term to expire January, 1932.

Commission shall appoint manager of utilities. Manager must be a Californian.

If surplus in any year exceeds 25 per cent of operating expenses, said surplus "may" revert to general fund, at option of board of supervisors.

Wages for all utility employees to be fixed by commission.

City attorney to act as legal adviser for commission with $4,000 addition to present salary of $8,000.

Commission shall monthly make appropriations for conducting all utilities, as follows: first, operations; second, bond interest and redemption; third, depreciation and accident reserve.

If commission wishes to fix rates at figure lower than cost of all expenses, such rates shall be submitted to board of supervisors, who can fix said lower rates by a majority vote.

The amendment was agreed upon after lengthy discussion, the main points of dispute being the provision making the commission elective, which it was contended would throw the entire commission into politics, which the creation of the commission was intended to prevent; the limitation that the manager of utilities should be a Californian, which it was argued would deprive San Francisco of securing the best executive possible; and the adoption of the word "may" in the section relating to the surplus reverting to the general fund, which will subject the surplus to an annual dispute as to its disposition and use.

Seattle City Light Department to Have 25-Story Building

Work was begun on Oct. 1 of removing old structures along the west side of Third Ave. between Madison and Spring Sts., Seattle, to make way for the new 25-story City Light Building, to be built at a cost of $2,000,000 by private capital. The structure will be a combination electric substation and office building of the tower type for the use of the city light department and for general tenants under a 50-year ground lease. The city light department will have the entire basement and sub-basement without rent for a new electric power substation to replace the one now on Yesler Hill and to take over the electric load of the central business district. Sufficient room for display of electrical merchandise and for offices of the department, now in the County-City Building, will be leased on other floors at low rates. After 50 years the building will become the property of the city.

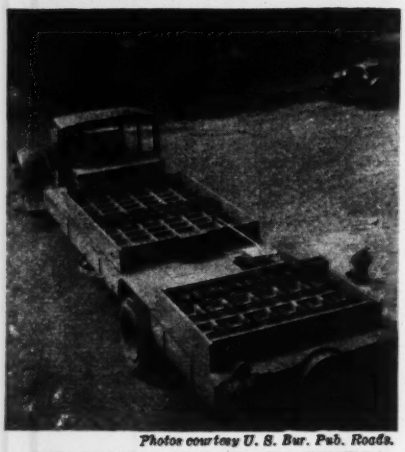
The structure will be built by L. A. De Coue, Paul N. Ford and Earl Morrison, local promoters and architects, following a referendum vote at the election last March.

To Measure Impact of Motor Buses on Modern Roads

Tests of the impact of motor buses on modern highway surfaces will be begun this month by the U. S. Bureau of Public Roads, in co-operation with the Society of Automotive Engineers and the Rubber Manufacturers Association. The War Department has made available for the tests a stretch of concrete paving at the Aberdeen Proving Grounds, Aberdeen, Md., and a manufacturer has loaned a large bus of interurban type which will be operated at speeds up to 50 or 60 miles an hour. It is expected that the tests will continue for about two months.

Apparatus developed in connection with the bureau's previous co-operative studies of motor-truck impact will be used to determine the magnitude of the impacts produced by large, heavily loaded buses equipped with various types and sizes of tires. The tires for the tests are to be furnished by the tire manufacturers and include both high-pressure and balloon types of the latest designs.

These studies of the impacts of bus traffic are the latest of a series of impact investigations the bureau has been making for the last ten or eleven years. The earliest studies dealt with the destructive effect on pavements of heavily loaded motor trucks, especially those with poor tire equipment. These tests demonstrated in a striking manner the protection afforded to pavements by the pneumatic tire and by the six-wheel vehicle.



Photos courtesy U. S. Bur. Pub. Roads.

MEASURING IMPACT BY BUSES ON ROADS

Above, a ten-element contact accelerometer, an instrument developed by engineers of the U. S. Bureau of Public Roads to determine the magnitude of impacts produced on concrete pavements by large heavily loaded vehicles. Below, chassis of bus, showing arrangement of loads in making impact tests on concrete pavement at Aberdeen Proving Grounds.

Clarification of Water-Power Laws Sought by Oregon Governor

In order to determine the scope of the present laws of Oregon designed to protect public interest in the development of water-power resources, Governor Norblad has asked the attorney-general to render an opinion upon the following questions:

1. Is a city permitted to appropriate by condemnation proceedings the water-power projects that have been constructed, or is the right confined to undeveloped water rights?

2. Are the existing acts broad enough and positive enough in their terms to provide for speedy termination of water-power permits held in idleness or for speculation by private companies or individuals?

3. Under the present laws is it legally possible for a private company to file upon one or more power sites on a stream and by doing a minimum or moderate amount of work on one site monopolize the entire stream to the exclusion of other companies or municipalities or against the will of constituted authorities?

4. Can the state engineer or the reclamation commission, at their discretion, withhold action upon applications for power licenses until the regular session of the legislature convenes in 1931? After the state engineer has once issued his permit authorizing the power company to proceed with its development, has the state any power through its legislative branch by subsequent legislation to fix fees or license tax or secure a revenue from the power companies for the use of the water in addition to the amount of fees now set by statute?

In asking for legal direction in these matters the governor advises the attorney-general that he will be largely guided by the answers to his questions in his message to the next legislature concerning recommendations for new laws and amendments to the present water-power code.

Committee Appointed to Report on Chesapeake Bay Bridge

A special committee of the Engineers' Club of Baltimore has been appointed by the Chesapeake Bay Bridge Commission to determine the best method of connecting the eastern and western shores of Maryland. The committee is composed of Bancroft Hill, chairman; Gustav J. Requardt, W. W. Pagon and Steuart Purcell. The bridge commission was named by Gov. Albert C. Ritchie, but the chairman, B. Howell Griswold, Jr., says

that hope has not been abandoned that the bridge will be constructed by private interests, which have held off because of financial conditions. No move will be made to block action by private interests, Mr. Griswold said, and if conditions improve to permit private enterprise to carry on the work the commission's report will be withheld. If not, the report will be submitted to Governor Ritchie, who will pass it on to the general assembly.

WASHINGTON NOTES

By Paul Wooton
Washington Correspondent

War Department Takes Levee Work From Orleans Co. Because of Its Use of Floating Clamshell Dredges

CONVINCED that levee work in the vicinity of Vicksburg being done by the Orleans Dredging Co. was proceeding too slowly, the War Department has taken part of the contract away from the company and has advertised for new bids. This is the second time within the past three months that the army engineers have taken work away from this company. According to explanations made at the War Department, the difficulty has been due mainly to the use of floating clamshell dredges in territory not suited to their use.

Originally the dredging company was awarded a unit contract for the construction of the Fitler and Valewood levees. Several months ago 20 per cent of the contract was taken over by the army engineers. It has now been decided to take over an additional amount of the work on the Fitler levee. The government engineers believe, however, that the work on the Valewood levee is progressing satisfactorily and that it will not be necessary to interfere with the operations there.

While desiring to accord the Orleans company every consideration in its attempt to introduce new equipment for building levees on the Mississippi, the army engineers do not believe that further exceptions can be made. They point out that experience has demonstrated that floating clamshell dredges are unsuited to work on the Mississippi, because the soil encountered in the lower valley is so porous as to require a long period for proper drying. During his trip down the river, Gen. Lytle Brown, the Chief of Engineers, observed that the work being done by the floating clamshell dredges was not standing up properly.

The bids have not yet been opened for the work recently taken over. It is expected, however, that the bids will be opened and new contracts awarded by the end of the month. After the work has been completed the difference between the original contract award and the amount paid by the government to the contractors on the work taken over will be paid to the Orleans Dredging Co. If it should develop that the government has to pay more to complete the work than was represented in the original contract, the bonding company will have to make up the difference. As the Orleans company has made considerable progress, it is believed that it is almost certain to receive some payment.

Additional Money Asked for Publication of Maps

Representations have been made to the Bureau of the Budget by American Engineering Council pointing out the need for additional appropriations to permit prompt publication of maps, stream-gaging records and other reports of the U. S. Geological Survey. State officials, local engineering societies and individual engineers are insisting that such material be made available with less delay than at present. During the past few years there have been material increases in the appropriations for topographic mapping and for water resources investigations. This has made more field work possible, but there has been no proportionate increase in the funds for engraving and printing maps and for publishing streamflow records.

Federal Aid for Emergency Landing Fields

Extension of federal aid to the construction of emergency landing fields will be agitated at the forthcoming session of Congress. Advocates of the plan contend that there is a close relationship between a system of such fields and the established lines of highway travel. The only way uniformity in layout, construction and marking could be secured, it is argued, would be by giving authority to a central agency. Experience with highway policies has proved, it is declared, that expenditures must be confined to a restricted system. In the case of landing fields the proposal is to begin on a very restricted system to be confined to the routes already largely used. It is the idea, however, to co-ordinate expansion of the system with the growth of air travel. In the case of the automobile, road improvement lagged behind the development of the vehicle. Since relatively small sums are involved, it is contended that the facilities should be kept just a little ahead of the development of the airplane.

New Rivers and Harbors Committee

As the result of the defeat of five of its members in the primaries, the rivers and harbors committee of the House is due for a major reorganization when Congress convenes. In addition to Chairman Dempsey of New York, Representatives Michaelson of Illinois, Hudson of Michigan and Chalmers of Ohio suffered reverses in the primaries. On the Democratic side Representative O'Connor of Louisiana also was retired. Several other members of the committee, including Representative Freeman of Connecticut, who is now ranking majority member, face stiff fights in the final elections still to be held.

If Representative Freeman, who is regarded as a strong administration man, is defeated at the polls, the chairmanship of the committee will pass to Representative Strong of Pennsylvania, the next ranking majority member. Even though the committee will not frame another omnibus rivers and harbors bill for some time, it still has some important tasks confronting it. The severe shake-up of its personnel that has been brought about by the primaries is therefore a matter of grave concern to those interested in river and harbor improvement.

From a geographical standpoint, the interior of the country has not fared as well as the coastal states in membership on the committee. Of the double tier of states flanking the Mississippi, only Louisiana, Missouri and Illinois received recognition in the past membership of the committee, and one of these states—Louisiana—has now lost out. In view of the attention given the development of a connected inland waterway system by the administration, it is believed that the interior states will play a more prominent part in the forthcoming reorganization of the committee.

Two Reports Likely on Columbia Basin Project

Unless action is taken by the President, separate engineering reports will be prepared by two government agencies dealing with the controverted Columbia Basin project. Surveys by the Corps of Engineers and by the Reclamation Bureau now are in progress. Friction already is evident and reports with conflicting findings are in prospect, but steps may be taken to co-ordinate the work.

The Business Outlook

Business seems to have reached the characteristic impasse of the low point of depression and is marking time while waiting for unprecedented low commodity prices to stimulate demand. Though still disappointing in its speed, gradual improvement in the general level of business activity continues at slightly more than the seasonal rate. The seasonal rise in industrial activity is still irregular and uncertain, but in general trade and in building it is more definite. Further improvement during October is fairly certain, but without a sudden and decisive change in business psychology and banking policy, it is difficult to see from what source to expect trade to gather sufficient momentum in the next six weeks to carry us through the winter onto higher and firmer ground next year.

—The Business Week, Oct. 8.

Brief News

THE TEXTILE TOWER, a seventeen-story building at Seventh Ave. and Olive St., Seattle, Wash., has been started. It will cost $1,250,000.

ACTUAL CONSTRUCTION of the proposed $1,300,000 power transmission line from the new Rock Island plant of the Puget Sound Power & Light Co. to Beverly Park substation, Everett, Wash., is now in progress. T. H. Campbell, engineer of the company, is in direct charge of the work.

THIS YEAR'S EXPENDITURES on Ontario's highways will amount to $8,500,000, according to George S. Henry, minister of roads. Highway work and improvements carried out or to be completed before the end of the present season include 235 miles of paving, 165 miles of grading and 14 bridges.

CONSTRUCTION HAS BEGUN on a new floating airplane hangar on Lake Union for the Alaska-Washington Airways at a cost of $50,000. The terminal, 100 ft. long and 56 ft. wide, will house eight planes and have waiting room for passengers, offices and machine shop. The company plans, with expansion projected for next year, to move the hangar to a new site.

A NEW CABLE SUSPENSION RAILWAY has been opened in Germany between Freiburg and an observation point called "Schauinsland." The length of the cable is 2.23 miles and the cars ascend a height of 0.8 mile. This distance is traversed in eighteen minutes and the cars carry 25 persons. The railway was built principally to serve the needs of winter sports.

WORK HAS BEGUN on a plan to bypass the flow of the river during the construction of the dam at Abitibi Canyon in northern Ontario in connection with the power development under way by the Abitibi Power & Paper Co., Ltd. The plan decided on is to excavate two tunnels in solid rock, to take the whole flow of the river. These tunnels will be 28 ft. in diameter, and will take the river flow around the dam site as soon as the cofferdam is in.

APPLICATION FOR A FRANCHISE to serve Butte, Mont., with natural gas has been filed with the city council by the Montana Power Co. Under the plans announced the company would construct a pipe line from the Montana fields at an approximate cost of $12,000,000 to $15,000,000 to carry the gas to Butte and Anaconda. The matter is expected to be presented to the voters by the middle of November.

INTEREST REQUIREMENTS for the first five months of operation of the bridge across the Columbia River at Longview, Wash., cannot be met from income, according to a statement from the bridge company dated Sept. 30, which reports net income for the five months' period of operation as approximately one-third the $128,000 interest requirement for the corresponding period. A statement from the bridge company suggests the deferment of interest for three years.

PURCHASE BY THE STATE of the last privately owned toll bridge in Arkansas is announced by the state highway commission. The bridge crosses White River at DeValls Bluff and was owned by the White River Bridge Co. The toll charge has been 75c. for each automobile, but the state will reduce this to 50c. until the purchase price, $463,000, has been amortized, when the bridge will be made free.

A REVIEW of all available literature on iron alloys is made possible by a fund of $230,000 contributed by organizations and companies interested in or producing or using steel and iron. The work, which will take five years to complete, will be undertaken by an iron alloys committee, of which George B. Waterhouse, professor of metallurgy at Massachusetts Institute of Technology, is chairman. The project is sponsored by Engineering Foundation.

FOR THE PROPOSED $2,500,000 TUNNEL beneath the Lachine Canal the Montreal Tramways Co. has agreed to pay one-third of the cost. The city will approach the federal government immediately to secure assistance in the cost of construction. It is hoped to be able to submit a referendum to the ratepayers of Montreal before the end of November and to commence the work shortly after approval is obtained. The tunnel would replace a bridge at Wellington St. which now carries street railway lines and vehicular traffic.

Society Calendar

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS, Washington, D. C.; annual meeting, Pittsburgh, Pa., Nov. 17-20.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, New York City; Pinehurst, N. C., Oct. 27-28.

AMERICAN IRON & STEEL INSTITUTE, New York City; semi-annual meeting, New York City, Oct. 24.

AMERICAN PUBLIC HEALTH ASSOCIATION, New York; annual meeting, Fort Worth, Tex., Oct. 27-30.

AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS, St. Louis, Mo.; annual convention, Richmond, Va., Oct. 13-17.

ASPHALT PAVING CONFERENCE, New York City; ninth annual conference, Memphis, Tenn., Dec. 1-5.

INTERNATIONAL ASSOCIATION OF STREET SANITATION OFFICIALS, Chicago; conference, Louisville, Ky., Oct. 9-11.

INTERNATIONAL ROAD CONGRESS; Washington, D. C., Oct. 6-11.

SOCIETY OF INDUSTRIAL ENGINEERS, Chicago; national convention, Washington, D. C., Oct. 15-17.

MISSOURI VALLEY SECTION, American Water Works Association, will hold its sixteenth annual meeting in Cedar Rapids, Iowa, Nov. 5-7. Earle L. Waterman, University of Iowa, Iowa City, Iowa, is the secretary.

NEW ENGLAND SEWAGE WORKS ASSOCIATION will hold its fall meeting in Fitchburg, Mass., on Oct. 15.

NORTH CAROLINA SECTION, American Water Works Association, will hold its tenth annual convention in Hendersonville Oct. 13-15. In conjunction with this meeting, the North Carolina Sewage Works Association will hold its eighth annual meeting. An interesting program has been provided.

Personal Notes

EDWARD H. PRENTICE, city engineer of Binghamton, N. Y., has been appointed acting city superintendent of construction to fill the vacancy caused by the resignation last June of John A. Giles, former mayor, who is now engaged in private engineering work in Brazil.

RALPH D. MORRISON, civil and mechanical engineer, has been added to the staff of the Thompson & Lichtner Co., Inc., of Boston, consultants on problems of design, construction and materials.

ALFRED C. CLARKE, district engineer for the Baltimore & Ohio Railroad for the past twelve years, with headquarters in Pittsburgh, has been named assistant chief engineer, with headquarters in Baltimore.

CHARLES B. BRYANT, of Baltimore, Md., who for the past eight years has been engaged in field engineering work for the Portland Cement Association in Virginia, Pennsylvania and Maryland, has been appointed senior assistant highway engineer of the state roads commission of Maryland.

RALPH FOGG, formerly head of the civil engineering department and Fritz engineering laboratory at Lehigh University, has opened an office in New York City and will devote his entire time to consulting practice, especially as regards steel and reinforced-concrete structures, foundations, dams, airports, and hydraulic and highway projects.

T. KEITH LEGARE, of Columbia, S. C., announces the formation of the Legare Engineering Co., with himself as president. The company will furnish a complete engineering service in municipal, highway and industrial engineering, also a system of advisory service for towns and counties in connection with the operation of public works.

C. E. STRICKLIN, since 1912 employed in the state engineering office, Salem, Ore., has been appointed state engineer by Governor Norblad, and this appointment has been approved by the state reclamation commission as required by law. Mr. Stricklin succeeds Rhea Luper, state engineer since 1923, who resigned recently.

Obituary

PATRICK LAYNE, 87 years old, for nearly 45 years a prominent road contractor in the western part of Indiana, died recently at his home in Crawfordsville, Ind., from paralysis.

JAMES S. POLHEMUS, associated with the U. S. engineer's office in Portland, Ore., died in that city Sept. 29, at the age of 78. Mr. Polhemus had been identified with port and harbor engineering in Oregon for a number of years, having initiated the Coos Bay and Yaquina jetties. A surviving son, James H. Polhemus, is general manager of the Port of Portland.

Construction Equipment and Materials

Rail Filler Patent Sustained

In a decision recently handed down by Judge Cooper in the United States District Court for the Northern District of New York, patent 1,171,441, under which the Philip Carey Co. manufactures Elastite rail filler, was held to be valid. The Philip Carey Manufacturing Co. brought suit against Henry Dumary, an Albany contractor, and the Albany Milling Corp., a dealer. The infringing rail filler was manufactured and the suit was defended by Servicised Products Corp. A decree was awarded for injunction and costs, with an accounting of profits.

Demonstrate Tractor Equipment

A large-scale demonstration of construction equipment for use with tractor power was held at the Peoria, Ill., plant of the Caterpillar Tractor Co. on Sept. 29 and 30. Graders, scrapers, draglines, trailers and other types of earth-moving equipment were loaned by their manufacturers and fitted to tractors of suitable power. The demonstration was for the benefit of the district representatives of the Caterpillar company in order to acquaint them with the various kinds of equipment available for use with tractors. Including agricultural tools, which were demonstrated on subsequent days, a total of 90 pieces of equipment, loaned by 40 different manufacturers, were demonstrated by skilled operators. The total investment represented, including the tractors themselevs, was estimated at $350,000.

New Developments

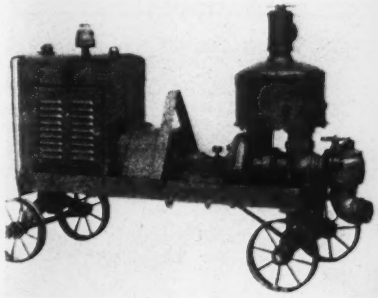
Plate Reinforces Dipper Doors

Designed to reduce wear and to minimize door and latch troubles caused by falling rocks, the Meyer Turtleback reinforcement unit for dipper doors has been placed on the market by the American Manganese Steel Co., Chicago Heights, Ill. This consists of a manganese steel casting, placed convex to the work, of ample size and strength to protect the door and mechanism from severe shock and distortion. It can be applied to any dipper door that is flat inside and that has not become distorted, is made for all different sizes of buckets, and can be quickly and easily secured to the inside of the door so as not to interfere with door braces and latch mechanism.

REINFORCING PLATE INSTALLED ON DIPPER DOOR

Centrifugal Pump Equipped With Tank for Self-Priming

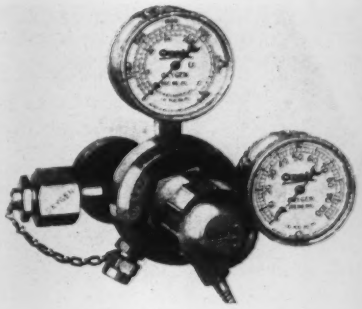
With only one moving part aside from the centrifugal pump itself, simplicity is the keynote of a new self-priming pump unit produced in 2½-, 3-, 4-, 6- and 8-in. sizes by A. S. Marlow, Ridgewood, N. J. Vacuum pump, chain or belt, friction clutches, floats or other delicate mechanical devices are not used, the initial and consequent priming of the mechanism being secured by water contained in a plain steel tank above the pump. Because of the entire absence of mechanical devices, the pump can be operated with only minor attention. The manufacturer claims that on a well point system a vacuum of 25 to 27 in. can be maintained without any special attention, provided conditions permit.



4-IN. SELF-PRIMING CENTRIFUGAL PUMP

Two-Stage Regulator Stabilizes Oxygen Pressure

A constant line pressure free from any fluctuation is most desirable for good results in oxyacetylene welding. The Oxweld type R-43 oxygen welding regulator, recently introduced by the Oxweld Acetylene Co., 30 East 42d St., New York, guarantees a freedom from fluctuation by means of a system of two-stage pressure reduction. This two-stage reduction is accomplished through two separate and independent sets of diaphragms, valves and springs. The full cylinder pressure of 2,000 lb. per square inch enters the regulator through a stem-type valve and is controlled by the first stage diaphragm. In this stage the pressure is reduced to less than 250 lb. per square inch. This pressure will be constant for any one regulator, but varies somewhat with different regulators. The pressure here is non-adjustable. The oxygen then passes from this first reduction assembly to a second stem-type valve and diaphragm assembly, where the pressure is reduced to that desired by the operator, being regulated by means of an adjusting screw. Any operating pressure may be obtained without fluctuation.



OXYGEN PRESSURE REGULATOR

The external appearance of the type R-43 regulator should be noted. Instead of the usual handle-type pressure-adjusting screw found on all other Oxweld regulators, there has been substituted a screw with a ribbed cap. This radical change in external design not only presents a neater and more compact appearance but will also avoid the possibility of breakage, as there are no projections on the handle to be bent accidentally. This new type adjusting screw is of smaller diameter than the body of the regulator itself, so that it is easier to pack for transportation from one job to another.

Filling Gasoline Tanks by Engine Suction

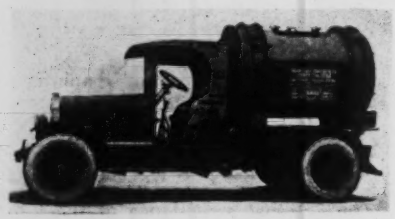
Fuel tanks can be quickly and easily filled from a barrel or other container without waste or spillage by means of the No-Loss fuel tank filler developed by Motor Improvements, Inc., Newark, N. J. This device can be installed on any tractor, road-building machine or excavating machine and is good for the life of the engine, as there are no gears or plungers to wear out. It consists of a filler head which fits into the opening of the fuel tank, with a permanent connection leading to the intake manifold of the engine. Another branch from the filler head extends, by means of 10 ft. of hose, to the barrel or other container used. With the engine idling, a vacuum is formed in the fuel tank sufficient to transfer 10 gal. of fuel per minute. As the tank level increases, it raises an aluminum float in the filler head which automatically cuts off the vacuum when the tank reaches its capacity. This provision makes it impos-

sible to run the tank over, with resultant waste and fire hazard. The system contains a built-in strainer to prevent any dirt or other foreign matter from entering.

In order to function properly, it is necessary that a perfect vacuum be formed in the fuel tank. This means that while the tank is being filled the engine must be supplied from an auxiliary tank connected to the fuel line leading to the carburetor. Many tractors already have this feature; where it is not provided, it must be installed with the filler system.

Truck Bodies for Transporting Ready-Mixed Concrete

Believing that an efficient concrete mixer cannot be built light enough to mount upon a motor truck and still stand up under continuous daily service, Norris K. Davis, Inc., San Francisco, Calif., is meeting the demand for the delivery of ready-mixed concrete with a series of concrete transfer bodies in which concrete is carried directly from a central mixing plant to the job. These are available in capacities of 1, 1½, 2, 3 and 4 cu.yd. for mounting on any make of truck chassis of appropriate capacity. The body consists of a rotating cylinder supported on four rollers that revolve in heavy-duty roller bearings. Power for rotation is obtained either from the truck engine through a power take-off and reduction gear or by a separate power unit. Welded to the drum shell are two high-carbon steel flanged track rings and a driving gear made from a chrome nickel steel forging. An adjustable brake to hold the drum in any position is mounted on one of the track rings. The loading gate, of steel construction, is equipped with a renewable rubber gasket joint to assure an airtight and water-tight seal. It is located midway between the two track rings and is loaded from above. The discharge gate, at the rear, consists of a steel plate sliding in machined adjustable guide. Opening and closing is by means of a hand wheel with double rack and pinion. Wear on the body is very slight, due to the fact that it is necessary to revolve the drum for only about the first 200 ft. and the last 400 ft. of the journey; during the rest of the time no rotation is necessary. Most loads can be discharged by gravity; it is only necessary to elevate the drum for low-slump concrete.



CONCRETE CARRIER BODY

Costs and Contracts

E. N.-R. Index Numbers

Cost			Volume		
Oct. 1, 1930	**198.72**		**Sept., 1930**	**232**
Sept. 1, 1930	199.58		August, 1930	259
Oct. 1, 1929	206.32		Sept., 1929	340
Average, 1929	207.02		Average, 1929	317
Average, 1928	206.78		Average, 1928	287
1913	100.00		1913	100

This Week's Contracts

Heavy construction contracts, reported by *Engineering News-Record* in the week of Oct. 9, with some comparisons, total as follows:

(In Thousands of Dollars)

	Oct. 9, 1930	Average of Last Four Weeks 1930	1929
Buildings:			
Industrial	$6,682	$5,185	$4,313
Other	20,856	23,181	48,487
Streets and roads	7,789	11,415	11,160
Other eng. constr..	17,215	14,814	10,946
Total	$52,542	$54,595	$74,905

Total, all classes Jan. 1 to Oct. 9:

1930	$2,677,038
1929	3,337,811

New Publications

Pipe—YOUNGSTOWN SHEET & TUBE CO., Youngstown, Ohio, has issued two valuable books of reference. The first of these, containing 72 pages, gives tabular data on pipe produced by the company, as well as descriptions of the process of manufacturing welded and seamless pipe. Suggestions for the care of oil pipe are also included. The second book, entitled "Standard Pipe Reference Book," includes tables and other data to assist in making pipe installations more uniform. It includes information on plumbing and heating practice compiled by Samuel E. Dibble, of the Carnegie Institute of Technology; standard symbols for plumbing, heating and power plant work; and tables giving the physical properties and weights of fittings and other standard items. Both books are bound in leather.

Belt Conveyors—The Link-Belt conveyor data book, a 176-p. leather-covered volume, has been prepared by the LINK-BELT CO., Chicago, Ill., to facilitate the selection and application of the proper type of belt conveyor in material handling. For this purpose a large amount of engineering data is included, much of it in tabular form.

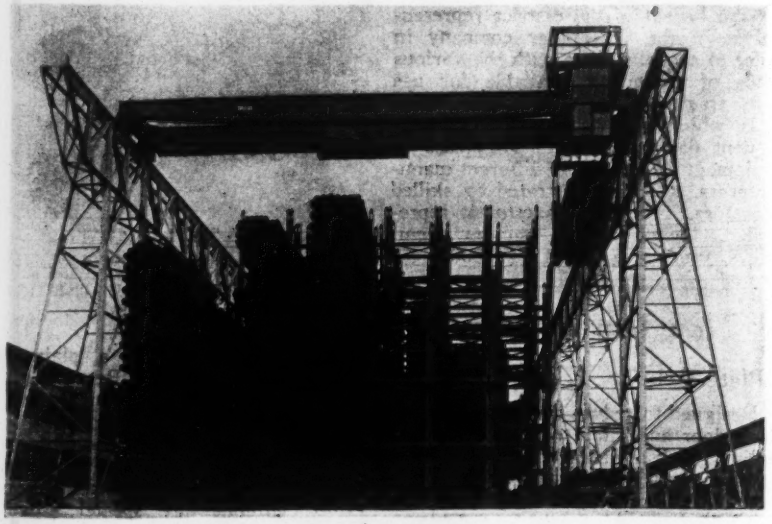
Gas Pressure Tables—Multipliers to be used in correcting gas volumes at varying pressures are given in an 18-p. loose-leaf booklet issued by the PITTSBURGH EQUITABLE METER CO., Pittsburgh, Pa.

Cement Testing—Apparatus and accessories used in the testing of cement and concrete are described in a 14-p. illustrated bulletin of the FISHER SCIENTIFIC CO., Pittsburgh, Pa.

Wrenches—Reversible ratchet wrenches of many types are described in a 40-p. illustrated booklet of the LOWELL WRENCH CO., Worcester, Mass. Special models for railway, bridge and transmission line construction and maintenance featured.

Compressed Air Equipment—Aftercoolers, for cooling and drying air after it is compressed and before it is delivered to the service pipes, are described in an 8-p. folder of the PENNSYLVANIA PUMP & COMPRESSOR CO., Easton, Pa.

Surveying Instruments—DAVID WHITE CO. INC., Milwaukee, Wis., has published a complete 100-p. catalog describing transits, levels and other surveying instruments for engineers, contractors and builders.



700-FT. YARD PROVIDES STORAGE FOR 450 MILES OF PIPE

To insure prompt delivery of welded pipe, the A. O. Smith Corporation, Milwaukee, Wis., has provided a yard for temporary storage consisting of a craneway approximately 700 ft. long and 100 ft. wide with a clearance of 77 ft. below the bottom of the crane rail. Pipe is taken from the manufacturing department in steel cribs, each of which contains a carload consignment, regardless of pipe size. These cribs are loaded upon special flat cars and transferred by rail to the storage yard, where they are lifted and stacked in tiers by a 50-ton P&H roller-bearing crane equipped with automatic grapple hooks. The uprights of each crib have pointed shoes fitting into recesses in the crib above, forming a firm connection and keeping the stacks level. It is calculated that the yard has sufficient capacity to hold 450 miles of 10-in. pipe, the equivalent of 952 carloads, with a total weight of 38,500 tons. When removing the pipe from the yard, the cribs are deposited on flat cars and taken to a loading platform. Here a 20-ton crane removes the pipe from each crib, holds it while steel binding straps are applied and lowers the complete carload into a gondola.

Unit Prices From Current Construction Bids

Concrete Arch Dam for Denver Water-Supply

ELEVEN MILE DAM, to be erected 130 miles from Denver and 50 miles west of Colorado Springs for the city and county of Denver, will be a concrete arch 112 ft. high with a maximum section 53 ft. wide at the bottom and 15 ft. at the top. Surface reinforcing against freezing will extend from the top to a little below water line. Bids were received Aug. 12 by the board of water commissioners and George Bull, consulting engineer, and the contract was awarded on the low bid of $469,506. The second bid was $470,745. The largest item, amounting to nearly a third of the total, is 49,000 cu.yd. concrete, on which the low bid was $6.40, the other bids ranging to $11. Cement, valves and outlet piping are to be furnished at the railhead, the contractor to haul and install the equipment.

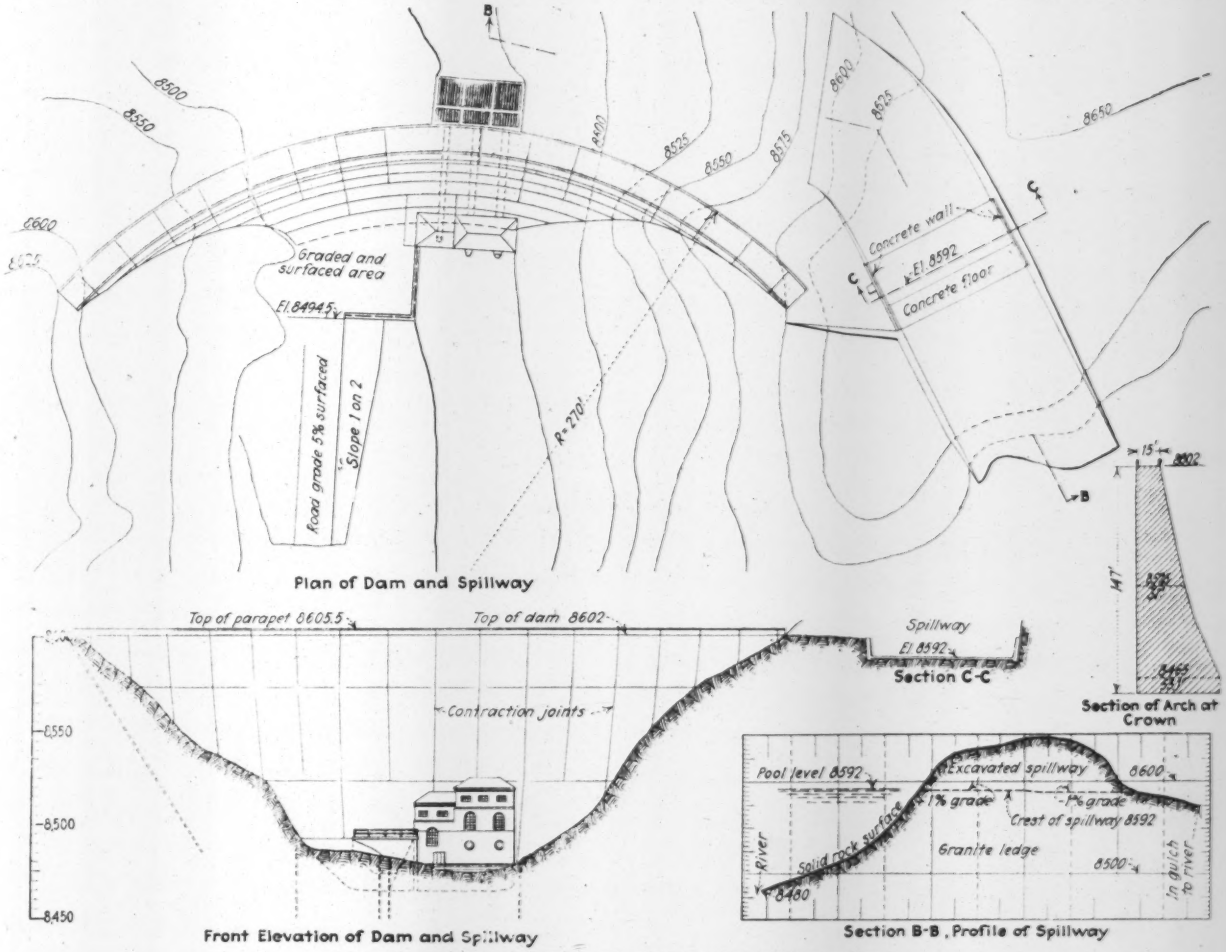
Nearest railroad shipping points are Divide, on the standard-gage Midland Terminal R.R., and Garo, on the narrow-gage Colorado & Southern R.R. Divide is 24 miles from the dam site and is reached by highway U.S. 40 South. Garo is some 30 miles from the site on the main highway between the site and Fairplay. The entire highway between Divide and the dam is below the proposed construction and part of the highway between Garo and the site might be flooded before the structure is completed, in which event the dam could be reached from Garo only over Wilkerson Pass by way of Lake George and Eleven Mile Canyon.

Item 1 includes the construction of cofferdams above and below the site, construction of a timber flume between the cofferdams, unwatering foundation and keeping it dry, diverting the river through a permanent dam outlet, and removing temporary diversion structures where they interfere with permanent operation.

Item 2 is for excavating earth and loose rock up to ½ cu.yd. and includes backfilling and the disposal of the remaining material. Backfill on the upper side of the dam consists in filling the entire space left by foundation excavation up to the elevation of the floor of the outlet trash rack structure, and is a combination of boulders, rock and earth. Item 7, for backfill on the lower side of the dam, consists of the embankment required back of the retaining wall and such large rock as may be placed across the face of the dam in front of the outlet tubes.

Items 9, 10 and 11 cover grouting. Core drillings show a hard and tight granite formation, indicating that there will be no seepage, and grouting and drainage holes are not expected to extend more than 25 ft. below top of foundation bed. To obtain uniform distribution of grout, piping is installed at the side of each construction joint, with short pipes laid horizontally from the vertical pipes to metal boxes that are set in the joints, from which grout can flow freely into the joints. Item 12 is for placing these boxes. Item 13 is for placing copper cutoff strips furnished by the commission to provide a tight construction joint.

Items 14, 15 and 16 are for concrete, respectively in retaining walls and floors, in outlet structures and in the



GENERAL PLAN OF ELEVEN MILE DAM FOR DENVER

Unit Prices From Current Construction Bids

dam. Concrete for the construction of the dam will be of 1:2½:4 mix by weight, with 7.5 gal. water per bag. Added to this will be 15 to 20 per cent of larger rock, which is omitted for reinforced concrete and for the smaller structures. No satisfactory sand has been found nearer than Colorado Springs. Coarse aggregate of all sizes may be made of the granite at the site.

Item 21 is for constructing the outlet house but does not include concrete or reinforcing.

In the general sequence of construction, the contractor first excavates the trenches in the abutment walls ready for placing concrete, and during this operation places the flume and cofferdam. It is expected that the foundation will be prepared by May 1, 1931. Payment is to proceed at the rate of 25 per cent in 1930, 50 per cent in 1931 and the remainder during the first six months of 1932. Contract is to be completed July 1, 1932, with a penalty of $100 per day. Available space in the reservoir is to be used after Oct. 1, 1931.

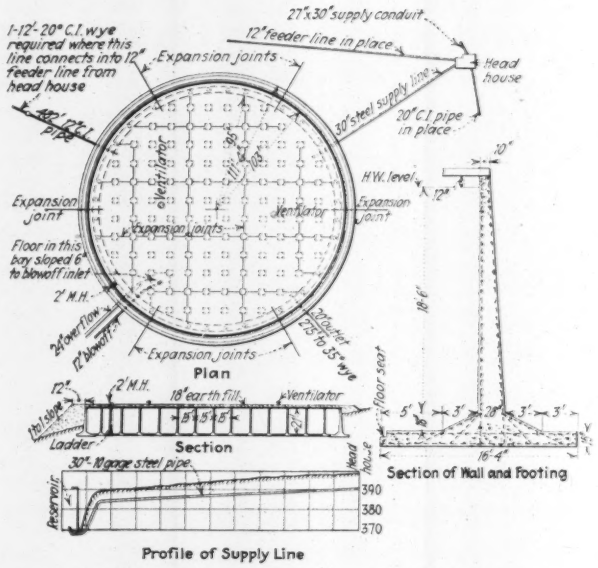
Eleven bids were received, averaging $607,000. Unit prices are given of the lowest three bidders, all of Denver: A, Gordon Construction Co.; B, J. H. Miller & Co.; C, Stearns-Roger Manufacturing Co. D. D. Gross is chief engineer of the board of water commissioners.

	A	B	C
Diversion of river and care of water (lump sum)	$12,000.00	$8,000.00	$24,000.00
4,406 cu.yd. excavation, earth and loose rock	2.35	2.00	1.50
3,950 cu.yd. excav., solid rock below El. 8480	5.50	8.00	6.00
6,980 cu.yd. excav., rock above El. 8480	4.25	2.50	4.60
5,600 cu.yd. excav. rock, stripping over surface of spillway and borrowpits	4.25	1.00	4.60
1,600 cu.yd. backfill on upper side of dam	1.50	.50	1.00
4,100 cu.yd. backfill on lower side of dam	1.00	.50	.75
200 cu.yd. surfacing road and graded areas	3.00	2.50	3.00
800 lin.ft. drilling grout and drain. holes	1.50	2.00	1.50
20 cu.yd. pressure grouting	60.00	100.00	60.00
25,750 lb. placing metal grout and drainage pipes	.10	.03	.09
711 placing metal grouting boxes	1.50	1.00	.30
1,700 lin.ft. placing metal cutoff strips	1.00	.20	1.00
850 cu.yd. conc. in retaining walls and floors	12.00	13.00	20.00
620 cu.yd. conc. reinf. in outlet structure and parapets	24.00	10.00	20.00
49,000 cu.yd. conc. in dam structure	6.40	7.20	7.33
88,629 lb. placing reinf.	.03	.03	.03
215,904 lb. placing metal lining for outlet conduits	.03	.03	.03
182,000 lb. installing gate valves and appurtenances in outlet structure	.03	.04	.04
34,800 lb. installing screens	.03	.03	.04
Valve and power house, exclusive of conc. (lump sum)	2,800.00	3,000.00	4,279.21
Totals	$469,506	$470,745	$534,740

Covered Reservoir for Provo City, Utah

PROVO CITY, Utah, is to have a 5,000,000-gal. reservoir of the underground gallery type, 206 ft. inside diameter with water depth 20 ft., as shown in the drawing. Contract for excavating the site was let July 15, 1930, separately from the reservoir construction (contract Aug. 18). Material is a mountain wash containing gravel, small boulders, broken pieces of slate and sandstone slab rock. Excavation includes backfilling where reservoir is not below ground level. Backfilling is in the shape of a berm 12 ft. wide on top with an outside slope of 1 to 1, and this work is to proceed during excavation. Selected material will be placed on the top of the reservoir to a depth of 18 in. Contract price is 35c. for 17,300 cu.yd. of unclassified excavation and backfill, with the six bids averaging 47c.; price for earth reservoir cover is 45c., and 60c. average.

Reservoir walls and wall fittings are constructed of class A concrete of 1:1½:3 mix. Floor, columns and roof are of class B of 1:2:4 mix. Wall and footing between expansion joints must be placed in one pour. On the roof, construction joints are permitted at points of roof panel inflection. The floor is waterproofed by first mopping on a primer coat of petrolastic cement, on which is mopped a 10-oz. asphalt threaded felt, and on this a heavy coat of petrolastic cement (55 lb. to the square), then a layer of 10-oz. canvas duck, and finally the entire surface is given another heavy coating



GENERAL DESIGN AND SECTION OF WALL AND FOOTING OF PROVO CITY (COLO.) RESERVOIR

of petrolastic cement. The roof is waterproofed with a primer coat of petrolastic cement and a heavy coating of the same material. Inside walls are painted with hot boiled linseed oil.

Both contracts were let to T. G. Rowland, Salt Lake City. Unit prices of the principal items of the reservoir contract are given for the lowest three bidders, all of Salt Lake City: A, T. G. Rowland; B, H. E. Schraven; C, Christensen & Gardner. Frank Deming is city engineer; Kimball & Ullrich, consulting engineers.

	A	B	C
538 cu.yd. structural excav.	$1.10	$1.00	$1.00
532 cu.yd. trench excav.	.90	1.50	1.00
1,409 cu.yd. class A conc.	12.19	14.11	13.75
1,735 cu.yd. class B conc.	12.79	14.14	15.00
622,000 lb. reinf. steel	.0354	.0359	.04
165 lin.ft. wall and footing exp. joints	2.50	4.11	4.55
3,368 lin.ft. floor and column exp. joints	.15	.19	.23
300 squares waterproofing, floor	9.06	8.65	10.15
334 squares waterproofing, roof	1.80	1.72	2.37
125 squares waterproofing, walls	1.75	1.25	1.10
Totals	$72,110	$78,226	$82,430

Subcontract Prices on Chicago Schools

SUBCONTRACTS for additions to two Chicago schools were awarded by the board of education in the latter part of September, 1930. The schools are the Senn High and the Gresham Elementary, both left from the 1929 program, and the contract prices are listed below.

CURRENT CONTRACT PRICES ON TWO CHICAGO SCHOOLS

	Nicholas Senn	Per Cent of Total	Gresham	Per Cent of Total
General	$314,650	28.50	$51,230	29.00
Carpentry	132,725	12.00	15,900	9.00
Structural steel	85,145	7.70	7,300	4.14
Steel erection	36,540	3.30	4,096	2.32
Plastering	56,640	5.13	9,720	5.50
Roofing	10,118	0.92	995	0.56
Sheet metal	26,608	2.41	5,515	3.12
Painting	.....	.....	5,000	2.84
Fireproofing	58,413	5.28	7,290	4.13
Plumbing	77,900	7.05	3,766	2.14
Steam heating	175,740	15.90	23,990	13.60
Heat regulation	8,926	0.81	1,523	0.86
Ventilating	99,898	9.00	15,000	8.50
Electrical	.....	.....	16,485	9.35
Ash and coal conveyors	7,887	0.71	.....	.....
Ash ejector	1,737	0.16	.....	.....
Miscellaneous iron	.....	.....	3,776	2.14
Other	14,621	1.13	4,743	2.82
Total	$1,106,548	100.00	$176,329	100.00

CONSTRUCTION NEWS

Some of the Week's Large Projects

For further details turn to the appropriate sections in this issue.

Location	*Project*	*Cost*	*Status*
Waterworks			
San Francisco	Pipe line	$1,500,000	Proposed
University City (Mo.)	Pumping station, filtration plant, etc	2,000,000	Proposed
Sewers			
New York	Sewage disposal	7,000,000 to 8,000,000	Proposed
Bridges			
New Jersey	Structural steel	2,280,000	Contract
New York	Bridge approach	995,000	Contract
Roads			
Chicago	Paving, etc	1,663,000	Bids asked
Garages			
St. Louis	Oil service stations	3,000,000	Proposed
Factories and Mills			
Pittsfield (Mass.)	Tank plant	1,000,000	Proposed
Ontario	Steel mill	1,000,000	Proposed
Power Plant			
Arizona	Power units	3,000,000	Proposed
Unclassified			
East St. Louis (Ill.)	Marine terminals	1,500,000	Proposed
Buildings			
Brooklyn	Apartment	2,500,000	Separate contracts
New York	Bank	2,000,000	Proposed
Chicago	Hospital	3,000,000	Proposed
Los Angeles	Office	2,000,000	Proposed
Dayton	Office, etc	1,000,000	Separate contracts
Seattle	Office	1,250,000	Contracts
Victora (B. C.)	Court house	1,000,000	Proposed
Toronto (Ont.)	Museum	1,500,000	Proposed
Gary (Ind.)	School	1,000,000	Bids asked
Waltham (Mass.)	High school	1,000,000	Proposed
New York	Telephone exch	1,000,000	Proposed

WATERWORKS

PROPOSED WORK

Ark., Bentonville — Waterworks improvements. $35,000. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engrs.

Ariz., Miami—Arizona Edison Co. preliminary plans distribution system and 1 m.g. steel tank. $60,000. J. K. Kent, Safford, mgr.

Ariz., Thatcher — Arizona Edison Co. preliminary plans replacing 4- to 10-in. mains. $40,000. J. K. Kent, Safford, mgr.

Calif., San Francisco—Preliminary surveys pipe line from San Lorenzo to Newark connecting with East Bay Municipal Utility Dist., to prevent water shortage. $1,500,000. N. A. Eckart, ch. engr. Municipal Water Dpt.

Calif., San Francisco—Bd. P. Wks., A. Hester, secy., relocating watermains. $26,700.

Ill., Evanston—City, C. H. Bartlett, Mayor, 200,000 gal. reservoir, 150 ft. high, $53,000, enlarging distribution system, $18,700. W. W. Polk, supt.

Ind., Sellersburg—New waterworks. $27,750.

Ia., Algona—Preliminary plans filtration plant, enlargement storage facilities. $30,000. M. Morris, Webster City, engr.

Kan., De Soto—Waterworks, sewerage systems. E. T. Archer & Co., 609 New England Bldg., Kansas City, Mo., engrs.

Ky., Louisville—Louisville Water Co., 47,800 ft. 6- to 12-in. c.i. mains to Glenview and other suburban districts in southern part city. $140,000. J. Chambers, c/o owner, engr.

Mo., University City — St. Louis Co. Water Co., 6600 Delmar Blvd., preliminary plans brick, concrete high pressure pumping station, additional filtration facilities, extending distribution system, equipment. $2,000,000. Private plans.

N. J., Lodi—Bd. Boro Council, Boro Hall, preliminary plans return water pipes from Well 7, on Hamilton Ave., and Wells 5 and 6, Linden St. to Pump House 2, and installing air lift pumps at Wells 5, 6 and 7. $15,000.

N. J., Newton — Town Com. 150,000 gal. water storage tank in High St. $18,000.

N. Y., Brooklyn—New York Water Service Co., W. R. Edwards, pres., 27 William St., New York, artesian well, Franklin Ave. and Sullivan St., $20,000; also pumping station at Dahill Rd. and Avenue C, $5,000. F. Brodsky, 40 Exchange Pl., New York, engr. and archt.

Tenn., Memphis — Extending water service, incl. 8,045 ft. 6 and 10 in. mains in Highland and Hollywood Sts., Jackson, Dexter and Chelsea Aves. $16,020. J. Sheehan, supt. waterworks. W. Fowler, Memphis, engr.

Tex., Houston — City, c/o W. E. Monteith, new plant with 2 new wells in north eastern part city; new wells at Scott St. and Heights plant. $412,000 bonds available. J. A. Sauls, Houston, waterworks engr.

Tex., Waxahachie—City, c/o T. C. Cheatham, mayor, waterwell, pump. $15,000. J. Rady, Waco, consult. engr.

Wis., South Milwaukee—For 2 m.g. addition to present water filter plant. Alvord, Burdick & Howson, 20 North Wacker Dr., Chicago, Ill., engrs.

Ont., Fort Erie—Bertie Twp. 1 mi. watermain, valves, hydrants. $15,000. Ontario Eng. Co. Ltd., Fort Erie, engr.

Ont., Toronto—Replacing 7½ m.g.p.d. (imperial) centrifugal pump at high level pumping station. $25,000. R. C. Harris, city engr.

BIDS ASKED

Calif., Beverly Hills—Oct. 21, by City Council, furnishing, installing 2,610 ft. 6 and 8 in. c.i. pipe.

Calif., Huntington Beach—See "Sports and Parks."

Calif., Oceanside—Oct. 22, by City Council, waterworks extensions. $22,000. R. L. Loucks, city engr.

Ky., Louisville — Oct. 28, by City, waterworks improvements, incl. new boilers, new filters having capacity 36 m.g.p.d. Alvord, Burdick & Howson, 20 North Wacker Dr., Chicago, Ill., engrs.; adv. E.N.-R. Oct. 9.

La., New Orleans — Dec. 3, by Sewerage & Water Bd., at office A. G. Moffat, secy., 526 Carondolet St., waterworks, sewerage, drainage construction during year, Contrs. 109-S and 110-S; adv. E. N.-R. Oct. 9.

N. J., Florence—See "Contracts Awarded."

N. J., Newton—Oct. 14, by Town Com., pumping station, elevated tank and c.i. pipe lines, valves, appurtenances. T. F. Bowe, 110 William St., New York, consult. engr.

N. J., Trenton—Oct. 24, by City Comn., City Hall, two 20 m.g. DeLaval centrifugal pumps, one 200 kw. rotary converter, switchboard and transformer. $50,000. A. Swan, city engr. Noted Oct. 2.

N. J., Ventnor—Oct. 13, by Bd. City Council, City Hall, 300,000 gal. elevated steel tank, 122 ft. high, on pile, concrete found., $15,000. E. F. Rightmire, 530 Guarantee Trust Bldg., Atlantic City, engr.

O., Cincinnati—Oct. 14, by Bd. Comrs. Hamilton Co., Water Supply Line 118, Dists. 1 to 8 (inclusive) Caldwell-Amity, 2,356 lin.ft. 6 in. Class B or 250, c.i. pipe, laid complete incl. valves, hydrants, appurtenances; Water Line 145, Dists. 1, 2, 4, 7 and 9, Muddy Creek Rd., Terrace Park, 7,722 lin.ft. 6 in. Class B, 3,520 lin.ft. 6 in. Class C and 7,295 lin.ft. Class D pipe, 9,070 lin.ft. Class B and 10,530 lin.ft. Class C, 8 in. c.i. water mains, with fire hydrants, valves, special castings. J. Krollmann, pres.

O., Conneaut—Bd. Control, bids about Oct. 27, expanding waterworks facilities, incl. improving pumping station, reservoir, extending mains. $75,000. Brown-Morgan Eng. Co., Lorain, engrs.

Pa., Phila.—Oct. 21, by Bureau Hys., Dpt. P. Wks., City Hall Annex, A. Murdock, dir., Schedule E, furnishing, laying 53 tons 6 and 8 in. c.i. water pipe in Olney Ave. from Wister to 20th Sts.

Tex., Brownsville—Oct. 31, by H. Van Horn, city secy., new and complete 4 m.g.d. water filtration plant; adv. E. N.-R. Oct. 9. Noted Sept. 4.

Ont., Niagara Falls—Oct. 15, by W. A. McDowell, secy.-treas., Bd. Water Comrs., City Hall, 1 high pressure and 3 low lift pumps with necessary valves and piping; motors, necessary electrical equipment for above pumps. $30,000. H. G. Acres & Co. Ltd., Ferry St., engr.

CONTRACTS AWARDED

Calif., Long Beach—City Council, to U. S. Pipe & Fdry. Co., 2326 East 8th St., Los Angeles, 18,400 ft. 4 in. c.i. pipe $7,200, 54,000 ft. 8 in. $41,850, 18,000 ft. 12 in. $24,750. Grand total $73,800. Noted Sept. 25.

Calif., Whittier—D. E. Allen, city clk., 10 m.g. concrete lined reservoir, to Southern Constr. Co., 806 Rodeo Dr., Beverly Hills, $69,040.

Del., Wilmington—Bd. Water Comn., laying 6 mi. concrete pipe from Old Mill Valley to 18th and Boulevard Sts., to Lock Joint Pipe Co., Ampere, N. J., $480,000.

Ind., Kouts — City Council, waterworks, to Cole & Moore Co., South Bend, $36,000.

Ia., Red Oak—Underground reservoir, covered with earth, 17 ft. high, 100 ft. diam., South 8th St., to B. J. Concrete Co., Red Oak, $23,000.

La., West Monroe—For 8,000 ft. 10 in. and 6,000 ft. 6 in. c.i. pipe, to McWayne Cast Iron Pipe Co., 3700 11th Ave. N., Birmingham, Ala., and 1,100 ft. 8 in. Universal pipe, to Central Fdry. Co., Comer Bldg., Birmingham, Ala. Est. $15,000.

Md., Baltimore—Bd. Awards, at office City Register, City Hall, Prettyboy Dam, to J. A. LaPorte Corp., 109 State St., Albany, N. Y., $996,733. Noted Sept. 11.

Md., Baltimore — Bd. Awards, storm drains, straightening channels Jones Falls and Western Run, vicinity Kelly Ave., Storm Water Contr. 153, to Catalano & Pecora, Old Town Natl. Bank Bldg., $33,486; sanitary sewers, storm drains, Storm Water Contr. 155, to N. Martell, 4400 Vesta Ave., $20,907. Noted Sept. 11.

Mich., Detroit—Dpt. Water Supply, constructing concrete foundation for 2 m.g. water tank, Trojan Ave., to W. H. Mueller, 2111 Woodward Ave., $17,190. Noted Sept. 11.

Mich., Detroit — Dpt. Water Supply, 4,700 lin.ft. electrically welded toncan iron mains, with accessories, to Julius Porath & Son, 903 Transportation Bldg., $80,450. Noted Aug. 21.

Mich., Northville—Detroit House of Correction, furnishing, laying 12 in. c.i. water pipe with fittings for water supply main for Men's New Prison at House of Correction Farm, to H. J. Cousino Co., 404 Owen Bldg., Detroit, $30,066.

N. H., Dover—City, water supply extension, to Layne-New York Co., Inc., 30 Church St., New York. Est. exceeds $15,000.

N. J., Florence—Twp. Com., standing tank, to Pittsburgh-Des Moines Co., 50 Church St., New York, $9,285; foundations, to Hill Constr. Co., Mount Holly, $2,627; well and pumps, to

See proposal advertising on page 124

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LEADITE

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~is used as a Jointing Material on Thousands of Miles of Bell & Spigot Water Mains throughout this Country and in many Overseas Countries.

The pioneer self-caulking material for c. i. pipe.
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Waterworks (Continued)

Layne New York Co., Inc., 30 Church St., New York, $2,800; fittings, valves, hydrants, to R. D. Wood & Co., 400 Chestnut St., Phila., Pa., $4,598. Grand total $19,310. Bids for laying pipe rejected, will readvertise. Noted May 8.

N. Y., New York—Bd. Water Supply, Gas & Electricity, Municipal Bldg., main in Allerton Ave., to L. D. Gregory, $5,337. Noted Sept. 11.

N. Y., New York—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., steel and c.i. mains in Riverside Dr., to W. F. Norton, 510 West 149th St., $11,437. Noted Sept. 18.

O., Dayton—W. W. Morehouse, dir. Water Dpt., two 900,000 gal. steel water storage tanks, to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill., $28,295. Est. $40,000. Noted Sept. 18.

Ore., Grants Pass—City Comn., intake towers for waterworks, to R. I. Stewart, Medford, $5,246; 6- to 12-in. c.i. pipe, to Pacific States Cast Iron Pipe Co., Spaulding Bldg., Portland, $50,727; 16 in. pipe, to U. S. Cast Iron Pipe & Fdry. Co., Colman Bldg., Seattle, Wash., $11,115; specials, to Wood Ewing Iron Wks., 1371 Macadam St., Portland, $3,559; and hydrants and valves, to Rensselaer Valve Mfg. Co., Seattle, Wash., $10,715. Grand total $81,362. Noted Aug. 21.

Tex., Dallas—City, c/o E. Goforth, drilling and casing well, 2,900 ft. deep to Trinity Sands, in Stevens Park, to R. H. Deering & Sons, 810 Allen Bldg., $31,500.

Tex., Refugio—City, c/o J. O. West, mayor, two 6 x 8 in. pipe lines, to W. G. Gullem & Co., Allen Bldg., Dallas. Est. $37,500. Noted Sept. 4.

Ont., New Toronto—Town Council, extending waterworks, new intake and sedimentation basins, to R. C. Huffman Constr. Co., 331 Bay St., Toronto, $99,100; filter building, to Herod Constr. Co., 53 Primrose Ave., Mimico, $9,590.

SEWERS

PROPOSED WORK

Calif., Los Angeles—Replacing 12 in. sewer with 15 and 18 in., sewers in Colorado Ave. from 20th St. to Ocean. $25,000. H. B. Carter, City Hall, engr.

Calif., Santa Monica — For 7,200 lin.ft. double strength 18 in. vitr. main sewer in Colorado Ave. H. B. Carter, city engr.

Ind., Indianapolis—Dpt. P. Wks., City Hall, 10 and 12 in. vitr. clay or concrete sewers in School and California Sts.

Ia., Creston—Sewage disposal plant, $80,000.

Kan., De Soto—See "Waterworks."

Kan., Osawatomie—Sanitary sewerage system, $25,000. Burns & McDonnell Eng. Co., 400 Interstate Bldg., Kansas City, Mo., engrs.

Kan., Wichita—Storm water sewer known as Lateral A of Storm Water Sewer 28. C. C. Ellis, city clk.

Md., Towson—Baltimore Co. Comn. rejected bids Sept. 29, 20,960 lin.ft. 8- to 24-in. t.c. sewer; 3,733 t.c. house connections, 737 ver. ft. brick manholes, Contr. 22-S, West Catonsville. Noted Sept. 18.

Mich., Flint — For South Side Interceptor Sewer from Swartz Creek to Flint River, 3,955 ft. 48 in. monolithic, rein.-con., brick or block pipe, brick, concrete manholes. $100,000. N. J. Vermilya, city clk. City Eng. Dpt., Flint, engrs.

O., Bedford—Village plans storm and sanitary sewers in 6 streets; sewage disposal plant, $175,000. Wright Eng. & Constr. Co., Bedford, engrs.

O., Cleveland Heights—For 2,500 ft. brick or concrete storm sewers in Euclid Blvd. To exceed $25,000. F. A. Pease Eng. Co., Terminal Tower Bldg., Cleveland, engrs.

Okla., Bartlesville — Sewage disposal plant, $25,000. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engrs. Noted Sept. 25.

Okla., Blanchard — Surveys new sanitary sewerage system, $45,000. Milliken & Whiteneck, Southwest Natl. Bank Bldg., Oklahoma City, engrs.

Okla., Britton — Preliminary plans sewers extensions, $25,000. Riggins & McMasters, 6031 West Main St., Oklahoma City, engrs.

Okla., Tulsa—For Dawson Sewage Disposal plant, near here. $100,000. H. A. Parker, city engr.

Okla., Tulsa—Enlarging Flat Rock Creek Disposal Plant. $75,000. H. A. Parker, city engr.

S. C., Greenville—Greater Greenville Sewer Comn., organizing combined sub-district to embrace former Country Club and Brushy Creek sub-districts and to provide for construction sewers $90,000. J. E. Sirrine & Co., Greenville, engrs., made surveys.

Tex., Baytown—Preliminary surveys storm sewers, most of main line will parallel Pelly-Baytown concrete hy. $30,000. Address City Comn.

Utah, Ogden—Sewers in 5th, and Ogden Aves., 26th, 15th, and 35th Sts. $30,000. J. H. Brown, city engr.

Ont., Saulte Ste. Marie—City, 8 in. vitr. tile sewer in North St. $33,000. A. H. Russell, city engr.

BIDS ASKED

Ill., Chicago—Oct. 16, by City, at office Bd. Local Impvts., City Hall, system of tile sewers, brick manholes, catch basins, in North Neva, Estes, Las Casas, Clifford, Lawson, Forest Glen, South Nagle, Narragansett, Nashville, North Nagle, North Natchez, North Neenah, North New England, South Nottingham, South Neva and Archer Aves. M. J. Faherty, pres.

Ind., Indianapolis—Oct. 17, by Bd. Comrs. Marion Co., Court House, Indianapolis, sewage disposal plant at Marion County Tuberculosis Hospital, Sunnyside, Oaklandon. $26,000. Address C. Brossman, Chamber of Commerce Bldg. M. Dunn, Indianapolis, co. aud.

Ky., Louisville—Oct. 30, by Commissioners of Sewerage, 400 Marion E. Taylor Bldg., 4th and Jefferson Sts., Peachtree St. Sewer, Sect. A—Contr. 50. W. M. Caye, technical engr.; adv. E. N.-R. Oct. 9.

La., New Orleans—See "Waterworks."

Mass., Boston—Oct. 21, by Dpt. P. Wks., sewerage works, Boston Proper, Charlestown, Brighton and West Roxbury, $25,000. J. A. Rourke, comr. Dpt. P. Wks.

Mass., Boston—Oct. 24, by Dpt. P. Wks., sewerage works in Stony Brook Sect. 11, West Roxbury. To exceed $25,000. J. A. Rourke, comr. Dpt. P. Wks.

Mass., Boston—Oct. 16, by Dpt. P. Wks., Savin Hill Bay Sewerage Works, Sect. 5, from Old Colony Parkway, easterly to tidewater, Dorchester. To exceed $25,000. J. A. Rourke, comr. Dpt. P. Wks.

Mass., Newton—See "Contracts Awarded."

Mont., Huron — Oct. 14, by City, vitr. or rein.-con. intercepting sewerage system, $60,000. O. A. Ricker, city engr. Older & Quinlan, 205 West Wacker Dr., Chicago, Ill., consult. engrs.

New Jersey—Oct. 28, at Junior High School, Gaston Ave., West Orange, outlet trunk sewer for certain streets in area between First and Second Mountains, West Orange, Essex Co., to joint trunk sewer serving certain municipalities in Union and Essex Counties. Alexander Potter, 50 Church St., New York, consult. engr.; adv. E. N.-R. Oct. 9.

N. J., Newton—Town Com., 115 Spring St., bids about Nov. 1, 675,000 gal. municipal sewage disposal plant, improving Sparta Ave. beds, $100,000. T. F. Bowe, 110 William St., New York, engr. Noted Sept. 18.

N. Y., Brooklyn—Oct. 15, by H. Hesterberg, pres. Brooklyn Boro. Boro Hall, sewers in Foster Ave., East 7th, East 46th, and Logan Sts.

N. Y., New York—Sanitation Comn., Municipal Bldg., bids about Dec. 15, Contrs. "A" and "B," sewage disposal plant. $7,000,000-$8,000,000. Fuller & McClintock, 170 Bway., engrs. Noted Mar. 27.

O., Cincinnati—Oct. 14, by Bd. Comrs. Hamilton Co., 4,322 lin.ft. 8 in. vitr. sewer in Local Sanitary Sewer 96, Dists. 1, 2 and 7, Kemper Rd. and Suffolk St.

S. D., Huron—Oct. 14, by City, intercepting sewer, manholes, small lift station, screening chamber, c.i. syphons. $50,000. Consoer, Older & Quinlan, 222 North Wells St., Chicago, Ill., engrs. Noted Apr. 10.

S. D., Sioux Falls — Oct. 13, by Bd. City Comrs., at office W. C. Leyse, aud., sewer in Glendale Ave. from 12th to Sioux Sts.

CONTRACTS AWARDED

Calif., Los Angeles — Sanitary sewer, house connections, resurfacing Pine St. and Pershing Dr. Sewer Dist., to M. T. Markovich, 1205 Stanley Ave., Long Beach. $116,215.

Calif., Los Angeles—Los Angeles Co., storm drain in Little Dalton Wash from 5th St. to Pasadena Ave. in Azusa, to A. O. Nelson, 136 North Huntington Dr., Pasadena. $23,719. Noted Sept. 24 Daily.

Ill., Chicago—Bd. Local Impvts., City Hall, drains in West 55th St., to P. Scalzitti, 2424 North Tripp Ave.; South Laramie Ave., to M. Di Vito, 5217 South Kostner Ave.; North McVicker, North Mobile and North Moody Aves., to A. Scully, 4504 Wrightwood Ave.; North Meade Ave., to N. Ranieri, 5036 Montana St.; c.i. water supply pipes, special castings, c.i. fire hydrants and valves, brick valve basins in East 121st Pl., Byron, South Green, South Peoria, and Vermont Sts., North Artesia, St. Lawrence, Yates, and North Melvina Aves., to Simon Ryan, 2927 West Congress St.

Md., Baltimore—Bd. Awards, furnishing, loading rein.-con. pipe, Material Contr. Co., 80, to Reed Concrete Co., Thomasville, N. J., $5,586.

Mich., St. Clair Shores—Village, 4 to 10 ft. monolithic concrete sewers and 30 in. corrugated iron pipe, pumping station, pumps in Trunk Sewer Special Assessment Dist. 1, to T. D. Nolan, 14101 Plymouth Rd., Detroit, $1,478,974 (second low bidder). Noted Aug. 15 under "Contracts Awarded."

Mass., Newton—City, constructing Edmunds Valley Sewer, day labor, $25,000 or more.

N. Y., Brooklyn—H. Hesterberg, pres. Brooklyn Boro. Boro Hall, sewer in Springfield Ave., to Matarazzo & Yondola, $1,378; East 53rd St., to P. Reibis, $1,869. Noted Sept. 18.

Nev., Reno—For 6- to 10-in. c.i. sewers, to I. Christensen Co., 109 Sierra St., $126,185.

N. Y., Mamaroneck—Bd. Sewer Comrs., Sewer Dist. 1, Edgecomb Rd., Mamaroneck (P. O. address Larchmont), glass enclosed sludge bed, to Kuchar Bros., Montvale. Noted Aug. 28.

O., Columbus—W. H. Duffy, dir. Serv., 3 concrete tanks for control sewage flow, and partial treatment, to B. Canini, 207 Fletcher St., $521,000. Noted Sept. 18.

O., Wickliffe—Village, sewers in 2 streets, to Manson Co., Engineers Bldg., Cleveland, $50,652; 1 street, to Nero & Patrick Constr. Co., Citizens Bldg., Cleveland, $10,687.

Okla., Tulsa—City, Sect. 9-G of Cat Creek Storm Sewer, to Rucks-Brandt Co., Thompson Bldg., $29,829. Est. $35,000. Noted Sept. 25.

Okla., Tulsa—Bd. City Comrs., Storm Sewer Project 9-I-30, to C. M. Brown, 1315 South Trenton St., $42,866. Est. $73,012.

Pa., Erie—M. J. Henry, city clk., City Bldg., sanitary sewers in Green Terrace and Ellsworth St., sanitary sewer, incl. 8 in. tile pipe, house connections, on Harris St. and East Glenwood Ave. S., grading, curbing 29th St. from Holland St. to west line German St., to J. and M. Doyle 307 Walnut St., $18,947.

Pa., Erie—M. J. Henry, city clk., City Bldg., sanitary sewers in Evanston Heights, Love Farm and Erie Terrace, to Marasco Constr. Co., Erie, $23,476 est. $34,000; Cameron Rd. and South Lands, also 29th St., to J. and M. Doyle Co., 307 Walnut St., $4,904 and $348 respectively; McCain Ave., to J. McCormack, 1345 West 10th St., $8,787. Grand total $37,515. Taking bids until Oct. 7. Main Street Sewer, $10,500. A. N. Aitken, City Bldg., engr.

Tex., Dallas—City, c/o E. Goforth, secy., concrete storm sewer culvert, Mill Creek Dist. 12-C, to Dallas Transportation Co., 817 Bourbon St. $45,434. Est. $65,615.

W. Va., Paden City — Sanitary sewers, to Fosco Constr. Co., Charleston, $25,866. Est. $25,000.

Wis., Milwaukee — City, to C. Stormowski, 950 Warren Ave., sewers in North Humboldt St., $6,675; to Werner Co., 821 8th Ave., Wauwatosa, North Sherman Blvd. $1,061, West Chester St. $565, West Peck Ave. $410, West Stevenson St. $365, row between West Nash and West 39th Sts. $357; to H. O. Schaefer, Inc., 79th St. and Sluger Ave., row south of West Morgan Ave. $400, West Capitol Dr. $450; to Pentany & Blunt, 4478 37th St., Austin St., $644; to Zimmerman & Zimmerman, 2826 State St., West Blue Mound Rd., $13,321; North Mount Vernon Ave., $13,443. Grand total $37,691.

Wis., Milwaukee—Sewerage Comn., driving piles, constructing concrete foundations for 1 story, 102 x 207 ft., sludge storage, for sewage disposal plant, Jones Island, to A. C. Goetzkow, Inc., 5310 State St., $22,890. Noted Sept. 25.

Wis., Milwaukee—Sewerage Comn., pumps, motors, and pipes for return sludge pumping plant, to Allis-Chalmers Mfg. Co., West Allis, $38,975; metering equipment, to Simplex Valve & Meter Co., 118 North Broad St., Phila., Pa., $3,027. Noted Sept. 18.

Ont., Sandwich—Township of Sandwich W. 8 in. and up vitr. tile concrete sewers, $100,000. W. J. Fetcher, Security Bldg., Windsor, engr.

Ont., Sudbury — For 7,000 lin.ft. 48 in. sewers, to R. H. McGregor Constr. Co., 205 3rd Ave. W., North Bay.

BRIDGES

PROPOSED WORK

Calif., Los Angeles—Los Angeles Co., 68 ft. 6 in. bridge 82 ft. wide, wooden piling, concrete footings over Ballona Creek at Duquesne St. County Bridge Department, engrs.

Conn., New Britain—New York, New Haven & Hartford R.R., R. I. Pearson, ch. engr., New Haven, concrete, steel railroad bridge, Corbin Ave. $25,000. Private plans.

Maine—State Hy. Dpt., Augusta, Cumberland and Sagadahoc Counties, Towns of Brunswick and Topsham, soon take bids bridge, on Main St. between Brunswick and Topsham. $151,000 appropriated. Noted Sept. 18.

BIDS ASKED

California — Oct. 29, by State Hy. Comn., Sacramento, three 35 ft. and one 22 ft. span rein.-con. girder bridge on concrete pile bents over Redwood Slough near Redwood City, San Mateo Co.; one 42 ft., two 31 ft., one 30 ft. 10 in. and one 30 ft. 2 in. span rein.-con. girder bridge on concrete bents over Atchison, Topeka & Santa Fe Ry. at Manhattan Beach, Los Angeles Co. C. H. Purcell, Pub. Wks. Bldg., hy. comr.

Ill., Chicago—See "Bridges."

Kansas—See "Streets and Roads."

Kentucky—See "Streets and Roads."

Ky., Bloomfield—Nov. 12, by State Hy. Dpt., Frankfort, five 16 ft. rein.-con. span bridge, rein.-con. piers, abutments, with sidewalks, handrails over Simpson Creek, also double 11 x 7 ft. rein.-con. culvert, with sidewalks, handrails over Hinkle Creek, S.P. 18-AB, Nelson Co. B. Johnson, chn.

Louisiana—See "Streets and Roads."

Maryland—Oct. 14, by State Roads Comn., State House, Baltimore, repairing slab bridge over Brooks Run, Contr. Sm-75-811, St. Mary's Co. H. Williar, Jr., Federal Reserve Bank Bldg., Baltimore, engr.; adv. E. N.-R. Oct. 9.

Michigan—Oct. 22, by H. C. Fleming, resident engr., Grand Rapids, steel deck girder bridge, M. Br. 1 of 70-6-1, Contrs. 1 and 2, also two 88 ft. span bridge, M. Br. 1 of 70-7-1, Contrs. 1 and 2, Ottawa Co., for State Hy. Comn., Lansing.

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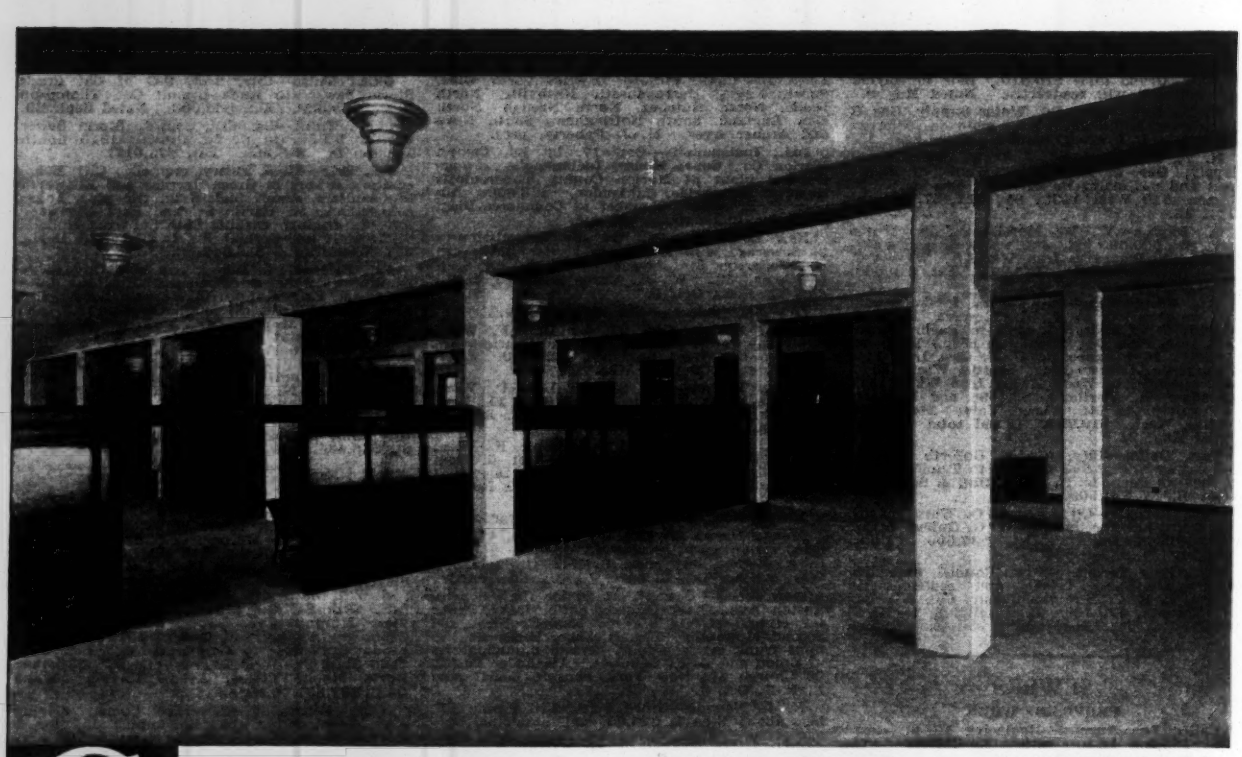

Concrete columns and floors at the newly remodeled Saddle & Sirloin Club, Chicago; high-early-strength concrete made with Universal Atlas methods and cement used in the construction. Poirot Construction Co., Chicago, contractor.

Saving time and materials

with *Universal Atlas* high-early-strength concrete

● ● ● The high-early-strength concrete used in remodeling the Saddle and Sirloin Club, Chicago, permitted the removal of alternate rows of shores five days after the concrete was placed. This is much sooner than is practicable with concrete made by ordinary methods. Not only was time saved but equipment also. Shores that were removed at the five-day periods were immediately available for use on other sections of the work. This permitted the contractor to cut down on the equipment required for the job.

● ● ● High-early-strength concrete made with Universal Atlas methods and cement (the same Universal Atlas standard portland cement as furnished for regular work) is stronger, more durable and more watertight than ordinary concrete. Send for booklet containing these methods for saving time and securing improved concrete. . . . . .

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Bridges (Continued)

Michigan—Oct. 23, by R. W. Roberts, resident engr., Saginaw, 2 rein.-con. abutments, steel deck girder bridge, FA. Br. 1 of 76-15-18, Contr. 1 and 2, Shiawassee Co., 40 ft. roadway, for State Hy. Comn., Lansing.

N. Y., Cortlandt — Oct. 27, at office Westchester Co. Park Comn., 72 West Pondfield Rd., Bronxville, stone faced over-crossing at Main St., Bronx Parkway extension. J. Downer, Bronxville, ch. engr.; adv. E. N.-R. Oct. 9.

N. Y., Greenburgh (mail Scarsdale)—Oct. 15, by Westchester Co. Park Comn., 72 West Pondfield Rd., Bronxville, superstructure, portions of substructure rein.-con., structural steel bridge at south end Woodlands Lake, Saw Mill River Parkway, J. Downer, Bronxville, ch. engr.; adv. E. N.-R. Oct. 9.

O., Cleveland—Oct. 11, by Bd. Comrs. Cuyahoga Co., 100 ft. bridge over Big Creek, Linndale Rd. $42,470. A. M. Felgate, Court House, engr.

O., Cleveland—Oct. 14, by Cleveland, Cincinnati, Chicago & St. Louis R.R., H. Baldwin, ch. engr., Cincinnati, 520 ft., rein.-con. bridge over West 41st St. $500,000. W. S. Burnett, 230 East 9th St., Cincinnati, engr. Noted Sept. 4.

Okla., Coyle—Nov. 6, by State Hy. Dpt., Oklahoma City, 8 span 1,140 ft. steel truss bridge on concrete piers, Logan Co. $275,000. A. R. Losh, hy. engr. Noted Sept. 4.

Tex., Fort Worth—Tarrant Co., c/o W. E. Yancey, taking bids rein.-con. bridge on Stone Foundry Rd. $50,000. D. A. Davis Co., Fort Worth, engr. Noted Apr. 3.

Wisconsin—Oct. 14, by State and Kewaunee Co. Hy. Comns., Green Bay, constructing Kewaunee Overhead Bridge, S.T.H. 17, C.A.P. 3345.

Wisconsin—Oct. 16, by State and Washington Co. Hy. Comns., Commerce Bldg., Milwaukee, Slinger Overhead, S.A.P. 2898, Washington Co.

CONTRACTS AWARDED

Alabama—State Hy. Dpt., Montgomery, concrete bridges on Federal Aid Project 212, Calhoun and Cleburne Counties, to S. Cook, Fairmont, Ga., $28,782; on Federal Aid Project 214, Shelby and Jefferson Counties, to H. N. Donahoo, 510 North 21st St., Birmingham, $107,823.

Calif., Los Angeles—Los Angeles Co., rein.-con. arch bridge over Los Angeles River, on Atlantic Ave., to Oberg Bros., 3470 Hollenbeck Ave., $183,400.

Calif., Oakland—Alameda Co., 2 rein.-con. bridges over Crandall Slough, to W. W. Hayes, Call Bldg., San Francisco, $50,744.

Illinois—State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, bridges in Cook Co., to F. E. Herdman, Winnetka, $14,760—Route 166, Sect. 101-B Williamson Co., to Shappert Eng. Co., Belvidere, $6,026—Route 166, Sect. 101-C Williamson Co., to V. L. Peters, Homer, $3,336—Macon Co., to Herrick Constr. Co., Carlinville, 5,681—Macon Co., to Vincennes Bridge Co., Vincennes, Ind., $7,797. Grand total $77,600. Noted Sept. 18.

Iowa—State Hy. Comn., Ames, bridges, culverts in Clayton Co., to M. E. Boyle, McGregor, $1,348 — Jones Co., to F. Ruddell & Sons, Waukon, $8,000—Mitchell Co., to W. A. Barton, Waterloo, $13,028 — Mitchell Co., to C. A. Holvik, Mason City, $7,690—Mitchell Co., to Hildebrand & Kraugh, Belmond, $4,656 — B-516 and B-21, Pottawattamie Co., to Wickham Bridge & Pipe Co., Council Bluffs, $28,600 and $2,390 respectively — grade crossings in Cherokee Co., to A. Olson Constr. Co., Waterloo, $14,760 — Union Co., to Jensen Constr. Co., Kimballton, $22,878. Grand total $103,350. Noted Sept. 25.

Kentucky—State Hy. Dpt., Frankfort, substructure, superstructure bridge over Cumberland River at Burnside, Pulaski Co., to E. R. Mills, Charleston, W. Va., $70,367 and $120,289 respectively — substructure bridge over Green River at Spottsville, Henderson Co., to Koss Constr. Co., 2818 5th Ave., Des Moines, Ia., $67,980 — substructure bridge over Kentucky River at Boonesboro, to J. A. Kries & Sons, 307 Burnwell Bldg., Knoxville, Tenn., $119,360 — substructures bridges over Tennessee River at Paducah, McCracken Co., and over Tennessee River at Eggners Ferry, to Union Bridge & Constr. Co., 1205 Kidland Bldg., Kansas City, Mo., $237,240 and $237,545 respectively — over Cumberland River at Smithland, Livingston Co., to Dravo Contg. Co., Neville Island, Pittsburgh, Pa., $147,470—over Kentucky River at Tyrone, Anderson Co., to H. Bickel Co., 435 Garden St., Louisville, $125,401—over Cumberland River at Canton, Trigg Co., to Gould Contg. Co., Ind. Bldg., 10th Ave. N., Nashville, Tenn., $142,036—superstructures bridges over Green River at Spottsville, Henderson Co., and over Tennessee River at Paducah, McCracken Co., to International Steel & Iron Co., 1243 Edgar St., Evansville, Ind., $118,927 and $307,394 respectively—2 over Cumberland River, one at Smithland, Livingston Co. and other at Canton, Trigg Co., to Nashville Bridge Co., foot of Shelby St., Nashville, Tenn., $212,862 and $231,124 respectively—over Kentucky River at Boonesboro, and over Cumberland River at Canton, to Vincennes Bridge Co., Vincennes, Ind., $56,337 and $298,097 respectively—over Kentucky River at Tyrone, to Virginia Bridge & Iron Co., Roanoke, Va., $171,966. Grand total $2,664,395. Noted Aug. 14 and 28.

Kentucky—State Hy. Dpt., Frankfort, substructure for stone faced design suspension bridge over Ohio River at Maysville, Mason Co., to Dravo Contg. Co., Neville Island, Pittsburgh, Pa., $460,160; superstructure for same, wrapped cable design, to J. A. Roeblings Sons Co., South Broad and Canal Sts., Trenton, N. J., $720,600. Noted Aug. 14.

Maine—State Hy. Dpt., Augusta, bridges in Frenchville, to Hunt & Palmer, Island Falls, $7,312—Fort Fairfield, to McEachern & McPherson, Greenville Junction, $12,499—Weld, to Cook & Co., Inc., Portland, $6,340—Rome, to W. V. Milton, Augusta, $7,110—Windham, to F. W. Fleming, Portland, $8,451. Grand total $41,712.

Maine—Canadian Pacific R.R. Co., J. M. R. Fairbairn, ch. engr., Montreal, Que., substructure bridge between Brownsville Junction and Greenville, to Dominion Constr. Co., Inc., Niles, Mich.; superstructure, to Bethlehem Steel Co., 25 Bway., New York. Noted July 10.

Massachusetts—Dpt. P. Wks., Boston, rein.-con. arch bridge, with stone facing, 700 ft. bituminous macadam approaches between Dover and Needham, to Lee Constr. Co., 133 Southampton St., Boston, $40,854; rein.-con. bridge, gravel approaches, Medway, to Hagan-Thibodeau Constr. Co., 45 Waterman Ave., Eden Park, R. I., $4,089. Noted Sept. 25.

Massachusetts—Dpt. P. Wks., Commonwealth of Massachusetts, 1 Ashburton Pl., Boston, 1,480 ft. rein.-con. bridge, approaches, Waltham and Weston, to J. P. McCabe, Inc., 20 Central St., Boston, $72,109. Noted Sept. 11.

Mass., Groveland—Essex Co., R. H. Mitchell in charge, Court House, Salem, concrete bridge to A. A. Hersey & Son, 197 Marginal St., Chelsea. Est. $25,000. Noted Sept. 25.

Mass., Tyngsboro — Commonwealth of Massachusetts, Dpt. P. Wks., Boston, 2 rein.-con. bridges, 500 ft. steel arch bridge, to Simpson Bros. Corp., 77 Summer St., Boston, $389,191. Est. $400,000. Noted Sept. 18.

New Jersey—State Hy. Comn., Trenton, furnishing, erecting structural steel for bridges over Hackensack and Passaic Rivers, Hudson and Essex Counties, to McClintic-Marshall Co., 39 Bway., New York, $2,280,990. Noted Aug. 28.

New York—General Manager Port of New York Authority, 80-90 8th Ave., New York, constructing Riverside Dr. connections of New York approach to Hudson River Bridge between Fort Washington, N. Y., and Fort Lee, N. J., to W. P. McGarry Co., 292 Freeman St., Brooklyn, $995,969. Noted Aug. 28.

N. Y., Croton—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, reconstructing Titicus Bridge, Croton Water Shed, to Thompson Eng. & Constr. Co., $4,900. Noted Sept. 18.

Pennsylvania — State Hy. Dpt., Harrisburg, two 100 ft. span half through truss bridge, with 24 ft. roadway, 5 ft. sidewalks, at Lawrence, Scott Twp., Washington Co., to Whittaker & Diehl, Union Trust Bldg., Harrisburg, $65,991. Noted Sept. 18 under "Streets and Roads."

Pa., Pittsburgh—Baltimore & Ohio R.R. Co., Baltimore, Md., H. A. Lane, ch. engr., and Maloney Bldg., Pittsburgh, A. C. Clark, div. engr., concrete viaduct, 2nd St., to Pihl & Miller, Wabash Bldg. Est. $75,000. Noted Sept. 18.

Pa., Pittsburgh—R. G. Woodside, controller Allegheny Co., reconstructing floor control system, incl. 40,000 b.m. creosoted oak ties, 130,000 ft. creosoted oak nailing pcs. and laminated floor, 135,000 lb. structural steel in place, 11,000 lin.ft. arc welding, 145,000 lb. traffic plates, to T. J. Foley Co., Euclid Ave., Bellevue, $43,300. Noted Sept. 11.

Ont., Hamilton—City, hy. bridge over Desjardins Canal, to Stanley Contg. Co., 400 Gage Ave. N., $65,553. Noted Sept. 11.

Que., Montreal—Canadian Natl. Rys., T. T. Irving, ch. engr., Union Sta., Toronto, Ont., masonry, abutments, approaches for bridges at Guy and Mountain Sts., to Kennedy Constr. Co., 407 McGill St.; steel work, to Dominion Bridge Co., 1111 Beaver Hall Bldg. Noted Sept. 19 Daily.

STREETS AND ROADS

BIDS ASKED

Alabama — Oct. 21, by State Hy. Comn., Montgomery, W. Finnell, dir., double bituminous surfacing 184,250 sq.yd. State Project 490, Pike Co.

Arizona — Oct. 15, by State Hy. Comn., Phoenix, grading 8.3 mi. Florence-Tucson Hy., F.A.P. 94-E. W. W. Lane, state engr.

California — Oct. 15, by State Hy. Comn., Sacramento, grading, untreated crushed gravel or stone surfacing 0.4 mi. High Rock Hill Rd., Humboldt Co.—widening to a clear roadway 28 ft. wide 5 concrete bridges between Vacaville and Dixon, Solano Co. C. H. Purcell, hy. engr.

California — Oct. 22, by State Hy. Comn., Sacramento, grading, asphaltic concrete paving 13.1 mi. road between Arroyo Salado and north boundary, Imperial Co.; clearing 5.3 mi. road between La Canada and Colby Canyon, Los Angeles Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

Calif., Los Angeles—Oct. 20, by Bd. Supervs. Los Angeles Co., grading, 2 in. warrenite on 4 in. asphaltic concrete paving A and I 75 Sunset Blvd. and Ellis Lane. To exceed $125,000.

Calif., Santa Barbara—Oct. 14, by Bd. Supervs. Santa Barbara Co., improving San Julian Rd., 50,000 cu.yd. excav., 18- to 30-in. corrugated iron pipe, 2.5 mi. wire fencing, incl. gates.

Calif., South San Francisco — Rejected bids grading, sewers, vitr. brick paving Linden Ave.

Idaho—J. D. Wood, comr. P. Wks., Boise, rejected bids Sept. 16, grading, graveling 5.448 mi. Sawtooth Park Hy., Lincoln Co. $33,622. Noted Sept. 11.

Ill., Chicago—Oct. 23, by Bd. Comrs. Cook Co., County Bldg., grading, paving 34.7 mi. Traffic Circle, Central, McHenry, Wolf and Palatine Rds., 111th, 127th and 131st Sts., Crawford, Cicero, Devon, Caldwell, Nagle, and Burnham Aves., also Glenwood-Lansing Rd. Culverts, Palatine Rd. Culvert, Waukegan Road-Chicago & North Western Ry. Grade Separation $1,663,000. G. B. Quimlan, 221 North La Salle St., engrs.

Ind., Crown Point—Oct. 27, by Bd. Comrs. Lake Co., gravel surfacing Frank D. Barnes Rd., $27,570. W. E. Whitaker, Crown Point, aud.

Ind., Ft. Wayne—Oct. 11, by Bd. Comrs. Allen Co., concrete surfacing 3.895 mi. Hicksville Rd., St. Josephs Twp. $110,591. J. H. Johnson, aud.

Ind., Ft. Wayne—Oct. 14, by Bd. Comrs. Allen Co., improving 1.63 mi. Fahlsing Rd., $23,256; 2.17 mi. Beck Rd., $23,290, both Wayne Twp. J. H. Johnson, aud.

Kansas — Oct. 15, by State Hy. Comn., Topeka, at Court House, Osborne, **(P. means Project and F.A.P. Federal Aid Project)**, mortar bed surfacing 5.142 mi. P. 40N-14, F.A.P. 371-C and 3.429 mi. P. 40N-14, F.A.P. 371-B, Osborne Co.—5.464 mi. P. 40N-13, F.A.P. 371-E, Rooks Co.—sand gravel surfacing 15 mi. P. 40N-7, Kansas Project 1043, Sheridan Co.—8.977 mi. P. 40N-6, Kansas Project 1042, Thomas Co. W. V. Buck, hy. engr.

Kansas — Oct. 17, by State Hy. Comn., Topeka, at Court House, Salina **(P. means Project, K.P. means Kansas Project, F.A.P. Federal Aid Project)**, local gravel surfacing 15 mi. P13-2-K.P. 1111, Chase Co.—sand gravel surfacing 12.5 mi. P. 15-20-K.P. 997, Clay Co. —1.909 mi. P. 15-19-K.P. 988, Clay and Dickinson Counties—3.023 mi. P. 15-18-K.P. 1112, Dickinson Co.—16.7 mi. P. 57-L-K.P. 1110, Geary Co.—3.514 mi. P. 81-10-F.A.P. 278-B, McPherson Co.—10 mi. P. 15-25-K.P. 996—20 mi. P. 36-24-K.P. 995—and 14 mi. P. 9-19-K.P. 1047, all Washington Co.—concrete surfacing 8.543 mi. P. 40S-16-F.A.P. 374-A, Salina Co.—two 90 ft. and three 140 ft. steel truss span bridge, P. 15-19-F.A.P. 377-A, Clay Co. W. V. Buck, hy. engr.

Kan., Topeka—Oct. 28, by Bd. Comrs. Shawnee Co., concrete paving 0.586 mi. 29th St., 18 ft., 2 in. asphaltic concrete on old macadam surfacing 2.014 mi. West 6th St., 19 ft., also superstructure for 110 ft. through truss span on Elmont-Rossville Rd., incl. 95,000 lb. structural steel (owner builds abutments). C. H. Wasson, Court House, engr.

Kentucky—Oct. 28, by State Hy. Dpt., Frankfort, surfacing 10.8 mi. Arlington-Mayfield Rd., S.P.1-FS, Carlisle Co.—3 mi. Lebanon-New Haven Rd., S.P.-62-BS, Marion Co.—grading, drainage structures 3.9 mi. Mannsville-Clementsville Rd., S.P.154-BG, Taylor Co.—grading drainage structures, bridge, approaches at Sulphur Fork Creek on Spottsville-Franklin Rd., S.P.52-AG, Allen and Simpson Counties. B. Johnson, chm.

Louisiana—Oct. 28, by State Hy. Comn., Baton Rouge, gravel surfacing 2.9 mi. Alto-Columbia Rd., Richland Parish—3 mi. Spearville-Farmerville Hy., Union Parish—4 mi. Hollaway-Rapides Hy., Rapides Parish—4 mi. State Cove-Whiteville Hy., St. Landry and Evangeline Parishes, $70,000—5.1 mi. Acy-Head of Island Hy., Ascension and Livingston Parishes $30,000—6.1 mi. Columbia-Chatham Hy., Caldwell Parish, $30,000—8.9 mi. Enterprise-Rosefield Hy., Catahoula and La Salle Parishes, $50,000—8 mi. Loganport-Hunter Hy., Desota Parish, $45,000—5 mi. Reddell-Foley Hy., Evangeline Parish, $30,000—7.3 mi. Womack-Winn Hy., Jackson Parish, $40,000—6.9 mi. Dubach Hy., Lincoln Parish, $40,000—5 mi. Waverly-Jackson Ferry Hy., Madison Parish, $30,000—8 mi. Fairview-Alpha School Rd., Red River Parish, $46,000—4.3 mi. Alto-Columbia Hy., Richland Parish, $25,000—5.3 mi. Many-Marthaville Hy., Sabine Parish, $26,000—9.1 mi. Winnsboro-St. Joseph Hy., Tensas Parish, $50,000 — 5 mi. Farmerville-Spearville Rd., Union Parish, $30,000—5 mi. Gueydan-Florence Hy., Vermilion Parish, $30,000—7.5 mi. Conkey-Foro Hy., Vernon Parish, $45,000—2 creosoted pile trestles 100 ft. long on Bayou Dorcheat Sarepta-Shongaloo Hy., Webster Parish. W. H. Norchauer, hy. engr.

Maryland—Oct. 14, by State Roads Comn., Baltimore, concrete paving 0.9 mi. Contr. D-66-12, Dorchester Co.—0.8 mi. Contr. G-62-63, Garrett Co.—sheet asphalt paving 0.46 mi. Contr. BC-97-72, Baltimore City. H. Williar, Jr., Federal Reserve Bank Bldg., Baltimore, engr.; adv. E. N.-R. Oct. 9.

Massachusetts—Oct. 14, by Dpt. P. Wks., gravel and bitulithic surfacing 6,000 ft. hy. Palmer. A. W. Dean, Dpt. P. Wks., Boston, engr.

Mass., Boston — Oct. 14, by Dpt. P. Wks., sheet asphalt or bitulithic paving Brier St., Ward 20, $25,000 or more; Oakhurst St., Ward 14, $25,000. J. A. Rourke, comr. Dpt. P. Wks.

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Streets and Roads (Continued)

Mass., Boston — Oct. 15, by Dpt. P. Wks., sheet asphalt or bitulithic paving Lillian St., Ward 1, $25,000; and Frawley St., Ward 10, $25,000 or more. J. A. Rourke, comr. Dpt. P. Wks.

Mass., Cambridge—Oct. 10, at office W. H. McMenimen, supt. streets, City Hall, sheet asphalt paving. $25,000 or more.

Michigan—Oct. 15, by L. N. Jones, resident engr., Crystal Falls, grading, shaping, drainage, concrete widening 1.108 mi. MO42-11 Contr. 1, Keeweenaw Co., 20 ft., for State Hy. Comn., Lansing.

Michigan—Oct. 21, by G. H. Greene, resident engr., Alpena, grading, shaping, drainage, one course gravel surfacing 2.771 mi. MO60-5 Contr. 2, Montmorency Co., 16 ft., for State Hy. Comn., Lansing.

Michigan—Oct. 21, at Village Clerk's Office, Durand, grading, shaping, drainage, concrete paving 9.181 mi. FO25-24C-1 and FO76-23C-1 and MO76-27C-1, Genesee and Shiawassee Counties, 20 ft., for State Hy. Comn., Lansing.

Michigan—Oct. 21, at office Village Clerk, L'Anse, grading, shaping, drainage, concrete paving 0.325 mi. MO7-11 Contr. 4, Baroga Co., for State Hy. Comn., Lansing. L. N. Jones, Crystal Falls, resident engr.

Michigan—Oct. 22, by L. N. Jones, resident engr., Crystal Falls, grading, shaping, drainage, concrete paving 7.852 mi. FO52-19 Contr. 2, Marquette Co., 20 ft., for State Hy. Comn., Lansing.

Michigan—Oct. 24, by R. W. Roberts, resident engr., Saginaw, grading, shaping, drainage, 2 course grave lsurfacing 1.174• mi. MO25-20 Contr. 1, 18 ft., Genesee Co., for State Hy. Comn., Lansing.

Mich., Adrian—Oct. 10, by Lenawee Co. Road Comn., grading, shaping, draining, 2 course Class B gravel surfacing, Class E bituminous macadam or concrete paving 4.125 mi. roads, 16 ft. J. L. Richard, Adrian, co. engr.

Nebraska — Oct. 16, at office Dpt. P. Wks., State House, Lincoln, sand gravel surfacing 3.2 mi. Beatrice-Lincoln Rd., Lancaster and Gage Counties—10.6 mi. Beatrice-Wymore Rd.—12 mi. Beatrice-Lincoln Rd.—8 mi. Beatrice-Tecumseh Rd., all foregoing Gage Co.—13 mi. Louisville-Chalco-Gretna Rd., Sarpy Co.—5.9 mi. Osceola-York Rd., Polk Co.—6 mi. Lamar West Rd., Chase Co.—4.4 mi. Arapahoe-Beaver City Rd., Furnas Co. R. L. Cochrane, Lincoln, state engr.

N. J., Elizabeth — Oct. 14, by Bd. Freeholders Union Co., Court House, grading, curbing, 9 in. rein.-con. paving 8,789 sq.yd. East Milton Ave.; 7 in. single line rein.-con. paving 6,550 sq.yd. Crawford Terrace. $50,000 or more.

New York—Oct. 24, by A. W. Brandt, comr. Hys., Albany, constructing roads in Nassau and Tompkins Counties; reconstructing roads in Schoharie and Suffolk Counties; adv. E. N.-R. Oct. 9.

N. Y., New York—Oct. 16, by H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., asphalt block on concrete paving East 148th St.—grading, curbing, sidewalks on Revere Ave.—sewer in Magenta St.

N. Y., St. George—Oct. 15, by J. A. Lynch, pres. Richmond Boro, Boro Hall, grading, bituminous macadam paving Garretson Ave.; concrete sidewalks on Metropolitan Ave.

O., Cleveland—Oct. 11, by Bd. Comns. Cuyahoga Co., 6 in. cold mixture surfacing 16,200 sq.yd. $48,600. F. Williams, Court House, engr.

O., Columbus—Oct. 18, by Comrs. Franklin Co., F. L. Donnally, clk., grading, 4 in. bituminous macadam paving 1.33 mi. Park Rd., Sect. 1, Sharon Twp., 18 ft. $25,335. C. C. Lattiner, Court House, engr.

O., Defiance—Oct. 15, by Comrs. Defiance Co., H. H. Reineke, aud., grading, draining, bituminous macadam paving 2.89 mi. Brininger Rd., Mark Twp., and Mud Creek Rd., Delaware Twp., 18 ft. $41,000.

O., Toledo—Oct. 20, by Bd. Comrs. Lucas Co., A. E. Schmitt, clk., widening, resurfacing Main St. from Jerusalem to Veler Rds., in Village of Bono, Jerusalem Twp.

Okla., Fairview—G. Shafer, clk. Major Co., rejected bids Sept. 23, due to an error in advertisement, grading, drainage structures, gravel surfacing 24 mi. roads, 30 ft. $125,000. M. Milton, Fairview, engr. Noted Sept. 18.

Pa., Phila.—Oct. 21, by Bureau Hys., Dpt. P. Wks., City Hall Annex, A. Murdock, dir., Schedule A, asphalt paving (assessment work) 8 streets—Schedule B, improvement (asphalt paving, assessment work) 1 street—Schedule C, asphalt repaving 2 streets—Schedule D, redressed granite block repaving 1 street, incl. shoulders — Schedule F, furnishing, setting granite curbing on north side Winter St. from Van Pelt to 22nd Sts.

Pa., West Middlesex—Oct. 17, by R. J. Fair, boro secy., asphalt or tar and limestone chip resurfacing 15,800 sq.yd. roads (Mercer).

Tex., Houston—Oct. 29, by Harris Co., H. L. Washburn, aud., and City, W. E. Monteith, mayor, paving Wayside Dr. from point 150 ft. south of Navigation Blvd. to north line Harrisburg Blvd.

Tex., Houston—City taking bids paving 6 mi. North and South McGregor Way Dr., 30 and 35 ft. wide. $125,000. J. M. Nagle, Houston, engr.

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Wash., Seattle—Bd. P. Wks. soon takes new bids filling Fairview Ave. N. Former bids rejected. R. H. Thomson, Seattle, engr. Noted Sept. 4.

Tex., Dallas — Oct. 9, by Comrs. Court of Dallas Co., C. E. Gross, aud., grading, drainage structures, Industrial Blvd. from Corinth St. viaduct to Turtle Creek Blvd. Rollins & Clinger, Records Bldg., dist. engrs.

West Virginia — Oct. 28, by State Roads Comn., Charleston, grading, gravel surfacing Den Run Bridge approaches, Project 1098 and Beatrice Bridge approaches, Project 3377, Ritchie Co. — Gorrell Run Bridge approaches, Project 18, Tyler Co.—furnishing 16,000 cu.yd. gravel at Red House, Project 3429, Putnam Co. G. E. White, secy.

Wisconsin—Oct. 15, by State and Dane and Jefferson Co. Hy. Comns., Madison, grading 1.746 mi. Milwaukee-Jefferson-Madison Rd., U. S. Hy. 12 and 18, F.A.P. 268-C; grading, crushed gravel surfacing 0.403 mi. Concord-Ixonia Rd., Jefferson Co.

Ontario—Oct. 20 (extended date) by Dpt. P. Hys., Parliament Bldgs., Toronto, concrete or mixed macadam paving 5 mi. St. Thomas-Port Stanley Rd.—grading, concrete culverts 41 mi. Peterborough Rd. easterly, Brighton Rd. northerly, Arthur Rd. east, across West Luther Twp., Greenwood Diversion, L'Original Diversion, Norwood Diversion Paris Rd. E., Blythe Diversion, and Stone Creek cut-off, grading 16 mi. Gananoque-Seely's Bay Rd., and Brooklin west —concrete structural steel bridges Severn and east of Arthur. R. M. Smith, deputy minister of hys., Ontario. Noted Sept. 25.

Ont., Oshawa—See "Contracts Awarded."

Quebec—Oct. 14, at office J. L. Boulanger, deputy minister Dpt. Roads, bituminous concrete paving section Hy. 2, Louisville (St. Laurent St.).

CONTRACTS AWARDED

Alabama—State Hy. Bd., Montgomery, grading, draining, chert surfacing 26.45 mi. hy. Jefferson-Shelby Counties, to State Board Administration, Montgomery, $501,222; 13.79 mi. hy. Calhoun and Cleburne Counties, to A. H. Singer, Lafayette, $154,005.

Ala., Athens—City, Council, 2 in. asphalt on 6 in. concrete paving 1 mi. streets on Coleman Heights Addition, to J. W. Chambers Lumber Co., Athens, $65,000. Est. $68,500.

California—State Hy. Comn., Sacramento, gravel base surfacing 8.1 mi. Williams-Maxwell Rd., Colusa Co., to D. McDonald, 1118 G St., Sacramento, $95,140—untreated crushed gravel or stone surfacing Clarks Corner-Placerville Rd., Eldorado Co., to C. E. Force, Piedmont, $83,909—grading, concrete surfacing South San Francisco Rd., San Mateo Co., to Basich Bros., Torrance, $89,162—grading 0.8 mi. West Boundary-Burnt Ranch Rd., Trinity Co., to H. H. Boomer, Mills Bldg., San Francisco, $31,476. Grand total $299,687. Noted Sept. 11.

California—State Hy. Comn., Sacramento, grading, untreated crushed stone or gravel surfacing 4.3•mi. Amador City-Martell Rd., Amador Co., to Yglesias Bros., 500 Spreckels Theatres Bldg., San Diego, $149,465.

California—C. H. Whitmore, dist. engr. State Hy. Comn., 302 State Office Bldg., Sacramento, pit run gravel borders 5.9 mi. road in Yolo Co., to Harms Bros., Galt, $4,216—5 mi. Colusa Co., to H. Sykes, Patterson, $4,665—5 mi. Butte Co., to C. Mankel, Sacramento, $4,470. Grand total $13,351.

California — State Hy. Comn., Sacramento, grading 0.8 mi. roads in Trinity Co., to H. H. Boomer, Mills Bldg., San Francisco, $31,476—gravel base surfacing 8.1 mi. 32 to 40 ft. Colusa Co., to D. McDonald, Sacramento, $95,140—untreated crushed gravel or stone surfacing 1•7 mi. El Dorado Co., to C. E. Force, Piedmont, $83,909. Grand total $210,525. Noted Sept. 18.

California — State Hy. Comn., Sacramento, grading, oil treated crushed gravel or stone surfacing 37.9 mi. road between 2nd crossing of Cuyama River and east boundary of San Luis Obispo Co. in Santa Barbara and San Luis Obispo Counties, to Lang Transportation Co., 5501 Santa Fe Ave., Los Angeles, $261,612.

Calif., Glendale—G. E. Chapman, city clk., curbing, guttering, storm sewers, 6 in. asphaltic concrete paving 195,000 sq.ft. Verdugo Rd., to Griffith Co., Railway Bldg., Los Angeles, $47,635. Noted Sept. 25.

Calif., Oakland—Bd. P. Wks., 2 in. asphaltic concrete on 6 in. concrete paving East 12th St., to Central-California Roads Co., Poplar and 28th Sts., $41,605.

Calif., Los Angeles—Los Angeles Co., grading, concrete paving Avalon Blvd., to G. W. Ellis, Bradbury Bldg., $205,417. Noted Sept. 4.

Calif., San Diego—Grading, c.i. mains, 6 in. asphaltic concrete paving West Point Loma Blvd., to Griffith Co., 2104 Main St., $34,585. Noted Sept. 4.

Calif., San Francisco—S. J. Hester, secy. Bd. P. Wks., City Hall, improving Sect. D, Sunset Blvd., to Calif. Constr. Co., Standard Oil Bldg., $97,890. Noted Sept. 11.

Illinois—State Dpt. P. Wks. & Buildings, Div. Hys., Springfield, paving roads in McDonough Co., to Moline Paving & Constr. Co., Moline, $4,152—Cook Co., to John Mackler & Co., Chicago Heights, $106,430—Montgomery Co., to Nelson Constr. Co., Jerseyville, $21,632—Johnson Co., to Jaicks Bros., 77 West Washington St., Chicago, $124,927—Pope Co., to French Constr. Co., Fairfield, $82,385—gravel surfacing roads in Pope and Johnson Counties, to Lenkering Bros., Round Knob, $7,407. Grand total $346,933. Noted Sept. 18.

Ill., Chicago—Bd. Local Impvts., City Hall, grading, curbing, guttering, sewers, 10 in. concrete paving Anthony Ave., to Calumet Coal Co., 9022 Commercial Ave.—grading, curbing, guttering, sewers, 7 and 8 in. concrete paving 1 alley, Belle Plaine, Richland and North Hoyne Ave., to P. J. O'Brien & Co., 4 North Cicero Ave.—West 112th St., to Hedges Constr. Co., 64 West Randolph St.—Oglesby Ave., to John Dillon & Co., 2953 South Halsted St.—Jerome St., Fargo, Birchwood and North Francisco Aves., to J. A. Sackley Co., 4608 Belmont Ave. —grading, curbing, guttering, sewers, asphalt on 6 in. concrete paving Roscoe St., North Nordica, North Avers, Newport and Wayne Sts., to Barber Paving Co., 7 South Dearborn St.—West 81st and 82nd* St., to American Asphalt Paving Co., 120 South La Salle St. — North Melvina and North Spaulding Aves., to J. M. Bransfield & Co., 3525 South Leavitt St.

Ind., Crown Point—Lake Co., concrete surfacing 2.75 mi. I. J. Sullivan Rd., to A. C. Proudfoot Constr. Co., Hammond, $77,400. Est. $116,400.

Ind., Indianapolis—Grading, curbing, guttering, 2 course concrete paving 17,400 sq.yd. College Ave., to Indiana Asphalt Paving Co., 2810 Columbia Ave., $33,770. Est. $79,211.

Ind., Indianapolis — Bd. P. Wks., concrete paving Ethel St., to J. N. Morgan & Son, 506 Inland Bank Bldg., $10,751 — Pratt St., to Indiana Asphalt Paving Co., 2810 Columbia St., $10,989—alley, to Abel Bros., 402 Amer. Central Life Bldg., $7,506. Grand total $29,226.

Iowa — State Hy. Comn., Ames, grading, flumes, paving 1.322 mi. roads in Clayton Co., to S. J. Groves & Sons, 306 Globe Bldg., Minneapolis, Minn., $56,380—0.72 mi. Hamilton Co., to Carlson Constr. Co., Marshalltown, $17,813—0.36 mi. Worth Co., to McKenzie & Kileen Co., Superior, Wis., $13,101 — grading 0.563 mi. Marion Co., to F. L. Patik, Cedar Rapids, $5,208 — 0.2 mi. Marshall Co., to Mobrey Co. & Bowers, Waterloo, $3,439—0.3 mi. Muscatine Co., to J. B. Hannas, Keokuk, $8,090—0.293 mi. Muscatine Co., to Snyder & Johnson, Humboldt, $9,561 — gravel surfacing 16.1 mi. Adair Co., to McDougall Constr. Co., Sioux City, $17,656—3.5 mi. Henry Co., to DeWees & Whitney, Springville, $8,400—118,750 lin.ft. cable guard rail, Dist. 9, various counties, to Thompson & Willis, Shellrock, $21,199—drain tile, intakes P-643 and P-673, Webster Co., to Raines & Burman, Hampton, $1,180 and $1,418 respectively. Grand total $159,833. Noted Sept. 25.

Ia., Afton—Town, c/o T. S. Spencer, clk., grading, curbing, guttering, paving 5,100 to 6,500 sq.yd. incl. 12,500 to 25,000 lb. reinforcing steel, to Amodeo Paving Co., 1420 Woodland Ave., Des Moines. Noted Sept. 11.

Ia., Primghar—O'Brien Co., graveling 11.18 mi. trunk and 20 mi. local roads, to Evans Constr. Co., Early, $18,629.

Kansas — State Hy. Dpt., Topeka, mixed bituminous surfacing 3.004 mi. Project 302-B, and 3.772 mi. Sect. D, Stafford Co., to D. H. Hardman, Alton, $9,839 and $12,358 respectively.

Kentucky—State Hy. Dpt., Frankfort, grading, surfacing approaches to bridge in Hardin Co., to Berry & Kelly, Louisville, $17,096; rein.-con. paving 13,162 mi. road in Crittenden Co., to N. E. Stone & Co., Madisonville, $230,437. Noted Sept. 11.

Louisiana—State Hy. Comn., Baton Rouge, concrete surfacing 2 mi. roads in St. Landry Parish, to T. L. James & Co., Inc., Russton, $42,690 — embankment, drainage structures 5 mi. Jackson Parish, to Harvey & Jones, Jonesboro, $15,100 — grading, drainage structures 5.17 mi. Winn Parish, to W. R. Guess, Quitman, $18,420—4.33 mi. Catahoula Parish, to F. D. Harvey & Co., Jonesboro, $17,154—removing 15 buildings from right-of-way, Webster and Bossier Parishes, to L. E. Turner, Innis, $5,645. Grand total $99,009. Noted Oct. 1.

Maine—State Hy. Comn., Augusta, graveling 2.08 mi. hy., Prospect, to W. H. Hinman, Skowhegan, $50,304; concrete paving 7.56 mi. Yarmouth and Freeport, to Lane Constr. Corp., 134 State St., Meriden, Conn., $141,682. Noted Sept. 11.

Maryland — State Roads Comn., Baltimore, concrete paving 0.8 mi. Contr. CL-90-52, Carroll Co., to Thomas, Bennett & Hunter, Westminster, $17,401; 1.17 mi. Contr. P-138-34, Prince George's Co., to Christhilf & Ensey, 1625 Ridgely St., Baltimore, $16,186. Noted Sept. 25.

Mass., Boston—Dpt. P. Wks., J. A. Rourke, comr., artificial stone sidewalks on Washington St., to P. Silverii, 161 Endicott St., $22,622. Est. $25,000.

Mass., Chelsea (br. Boston)—City, artificial stone sidewalks, to J. S. Coligan, 693 Bway., at $0.28 per sq.ft. Est. $25,000 or more.

Mass., Everett — Merrimac Chemical Co., Chemical Lane, macadam surfacing road, constructing sewers and drains in Chemical Lane, to Evans Constr. Co., 250 Stuart St., Boston. Est. $25,000 or more.

Mass., Framingham — Bd. P. Wks., A. C. Wínck, chn., bituminous macadam paving Concord St., to Framingham Constr. & Supply Co., Franklin St. Est. $25,000.

Michigan— E. R. Benkert, resident engr., Port Huron, grading, two course gravel surfacing 4.957 mi. MO79-28, Contr. 1, Tuscola Co., 18 ft., to J. Bright, Pigeon, for State Hy. Dpt., Lansing, $65,966, incl. cement. Noted Aug. 28.

Streets and Roads (Continued)

Michigan—City Clerk, Albion, grading, concrete and sheet asphalt on black base paving 0.683 mi. MO13-24. Contr. 1 (city of Albion), Calhoun Co., to Globe Constr. Co., Kalamazoo, for State Hy. Comn., Lansing. $35,782 incl. cement.

Michigan—H. C. Fleming, resident engr., Grand Rapids, grading, concrete paving 2.556 mi. MO41-26C-4, Kent Co., to E. J. Vander Veen, Grand Rapids, for State Hy. Dpt., Lansing. $68,400, incl. cement. Noted Aug. 28.

Michigan—G. H. Greene, resident engr., Alpena, grading, shaping, concrete paving 1.687 mi. MO72-16C-1, Crawford and Roscommon Counties, and 1.489 mi. MO20-17, Contr. 1, Crawford Co., 20 ft., to A. Jeffrey, Saginaw, for State Hy. Dpt., Lansing, $59,840 and $40,853 respectively (both incl. cement).

Michigan—R. H. Havens, resident engr., Jackson, MB 1 of 23-16-31, Contr. 1, Eaton Co., for State Hy. Dpt., Lansing, to American Bridge Co., 1328 Buhl Bldg., Detroit, $6,406; Contr. 2, to W. J. Anschutz, Saginaw, $40,268 incl. cement. Noted Aug. 28.

Mich., Detroit — Curbing, 3½ in. sheet asphalt on 8 in. concrete paving 10,000 sq.yd. Sorrento Ave., and 12,000 sq.yd. Evergreen Ave., to Detroit Asphalt Paving Co., 909 Transportation Bldg., $32,680 and $37,109 respectively.

Mich., Monroe—For one course 8 in. concrete paving North Monroe St., Sylvan, Stanford, Standish, Stockton and Stedman Drs., to W. H. Knapp Co., Monroe, $30,076.

Minn., Pelican Rapids — Curbing, guttering, paving 14,000 sq.yd., to Anderson & Sons, 100 North 7th St., Minneapolis.

Minn., St. Paul—Widening, repaving Pleasant Ave. between 6th and Ramsey Sts., to Thornton Bros. Co., 1343 Dayton Ave., $34,300.

Mo., Afton — A. Wenzlick, c/o Albert Wenzlick Real Estate Co., 1010 Chestnut St., St. Louis, grading 2 mi. winding drives in 80 acre White Haven Forest subdivision, St. Louis Co., near here, to F. A. Grant, 3965 Federer Pl., St. Louis.

New Hampshire—State Hy. Dpt., Concord, gravel surfacing 1.26 mi. hy., Conway, to A. D. Bridges & Son, Hazardville, Conn., $10,448; gravel surfacing 1.3 mi., Bethlehem, to Portland Contg. Co., Portland, Me., $11,391.

N. J., Garwood—Bd. Freeholders Union Co., Court House, Elizabeth, paving South Ave., to J. Locognito, Elizabeth, $95,113. Noted Sept. 26.

N. Y., Brooklyn—H. Hesterberg, pres. Brooklyn Boro, Boro Hall, to J. J. McCoy Asphalt Co., Avenue U and East 57th St., asphalt paving Berriman St., $5,209—to B. Turecamo Contg. Co., New Cropsey Lane, Cortelyou Rd., $51,654; Stone Ave. $6,822; grading Linden Blvd., $122,314—to Brooklyn Alcatraz Asphalt Co., 407 Hamilton Ave., East 4th St., $7,388; Bedford Ave. $36,509; East 7th St., $11,227—to J. M. O'Hara, Neptune Ave. and West 19th St., Locust Ave., $2,269—to Carbloc Paving Co., Stagg St., North 9th St. $20,037—Wyckoff Ave., $61,050. Grand total $324,479. Noted Sept. 18.

N. Y., Delhi—W. J. Howland, co. supt. hys., improving Bloomville-North Kortright and Doonan's Corners-East Meredith Co. Hy., Project 12, to O'Day & Ambrose, 14 Ayers St., Binghamton, $147,718. Noted Sept. 4.

N. Y., Long Island City—G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., asphalt paving 90th and 127th Sts., to Meehan Paving Co., 90 West St., New York, $5,924 and $6,435 respectively—42nd St., to Borough Asphalt Co., 1301 Metropolitan Ave., Brooklyn, $7,715 —granite paving 10th St., to G. P. Warren, $9,115 —grading Nassau Blvd., to Brugel Contg. Co., 1154 Cypress Ave., Ridgewood, $4,353—82nd St., to O. B. Junior Contg. Co., 8625 137th St., Jamaica, $8,884—Bell Blvd., to W. P. McDonald Constr. Co., 7 Lawrance St., Flushing, $33,911. Grand total $76,337. Noted Sept. 25.

N. Y., New York—J. Miller, pres. Manhattan Boro, Municipal Bldg., grading, sheet asphalt paving Forsyth St., to A. J. O'Brien, Inc., 17 East 42nd St., $217,426. Noted Sept. 18.

N. Y., St. George—J. A. Lynch, pres. Richmond Boro, Boro Hall, grading Richmond Ave., to J. J. O'Rourke, 239 Gordon St., Stapleton, $171,951. Noted Sept. 4.

O., Cincinnati—Concrete repaving 2.587 ft. Stanhope Ave. from Daytona to Schwartze Aves., 24 ft., to A. Freshwater & Sons, 906 Main St., $19,135. Est. $25,000.

O., Cleveland—Cuyahoga Co., curbing, brick on concrete paving 31,340 sq.yd. Belvoir Blvd., to N. Siegel, Western Reserve Bldg. $173,779. Est. $214,700.

O., Cleveland—Paving South Park Blvd., to Cleveland Trinidad Paving Co., Western Reserve Bldg., $43,709.

O., Defiance—F. C. Schneider, dir. Service Safety, grading, concrete paving Perry and East Sts., 29 and 31 ft., to W. L. Johnson Constr. Co., Hicksville, $27,941.

Okla, Tulsa—Bd. Comrs. Street Impvt. Dist. 1059, grading curbing, guttering, removing old pavement, Class B paving 9,235 sq.yd. 2nd St., to Standard Paving Co., 2119 East 11th St., $69,660. Est. $72,288.

Okla., Wewoka—Seminole Co., concrete paving 8.425 mi. State Hy. 48 north from Sasakwa, and 1.5064 mi. County Hy. 32 northwest from Konawa, to Ward-Beekman, Inc., 1801 East 9th St., Oklahoma City, $168,050 and $31,811 respectively. This corrects report in Oct. 1 issue.

Oregon—State Hy. Dpt., Salem, grading 13.53 mi. Fremont Hy., Lane Co., to Union Constr. Co., Union, $33,809—6.01 mi. Central Oregon Hy., Malheur Co., to E. C. Peck, Drain, $77,652—Wapeneta Hy., Wasco and Clackamas Counties, to A. Gentmann, Mount Argle, $31,500, Grand total $142,481.

Pennsylvania — State Hy. Dpt., Harrisburg, grading, concrete surfacing 2,800 ft. road in Mercer Co., to Holmes Constr. Co., Wooster, O., $77,622—31,900 sq.yd. Armstrong Co., to R. H. Cunningham & Sons, Turtle Creek, $358,150—4,200 sq.yd. Center Co., to D. Bailey, Morrisdale, $37,600—4,800 sq.yd. in Canaan Twp. and 8,800 sq.yd. in Slarrueca Boro, Wayne Co., to Tyler & Cole, Meshoppen, $35,868 and $39,925 respectively. Grand total $549,165. Noted Sept. 18.

Pennsylvania — State Hy. Dpt., Harrisburg, grading, concrete surfacing 15,500 sq.yd. Rockledge Boro, Abington Twp., Montgomery Co., to Cianchetti Constr. Co., Phila., $52,526. Noted Aug. 7.

Pa., Altoona—Asphaltic concrete on brick or 8 in. concrete paving 1,631 lin.ft. 6th Ave., 30 or 34 ft., to Keystone Paving Co., Inc., 320 Richd. St., Phila.

Pa., Duquesne—J. A. Hughes, supt. Streets & Pub. Impvts., City Hall, Porter rock paving North 1st St. and Hamilton Ave., to Davin Constr. Co., 911 Galveston Ave., Pittsburgh, $66,262. Noted Sept. 11.

Pa., Easton — Mayor and Council, concrete paving Catteli St. and portion Knox Ave., to H. S. Shafer, Nazareth, $37,433.

Pa., Glassport—For 4 in. brick on 6 in. concrete or 8 in. rein.-con. paving 0.12 mi. Erie and Indiana Aves., to McGrady Constr. Co., 517 McClure Ave., Homestead, $29,244. Noted July 24.

Pa., Pittsburgh—R. G. Woodside, controller Allegheny Co., curbing, guttering, culverts, 10 in. concrete paving 8,000 sq.yd., 6 in. slag paving 960 sq.yd. block stone paving 2,600 sq.yd. Interboro Ave., West Run Rd., Extension Homestead Park Rd. to Lincoln Place, Homestead Twp., to Paris Bros., 4414 Liberty Ave., $52,794; grading, culverts, curbing, guttering, concrete steps, storm inlets, retaining wall, rein.-con. cribbing, rein.-con. paving 18,000 sq.yd. Glassport-Elizabeth Rd., Glassport and Elizabeth Twps., to F. W. Scott, Hays, $124,458. Noted Sept. 11.

Tenn., Nashville — Concrete sidewalks, widening, sheet asphalt paving 8th Ave. from Bway. to Gleaves St., to Municipal Paving Co., Cotton States Bldg., $31,000—widening, brick paving 8th Ave. from Gleaves St. to reservoir, and 8th Ave. from Argyle to Wedgewood Aves., to W. L. Hailey Co., 314 42nd Ave. N. $40,400 and $25,400 respectively. Grand total $94,800.

Tex., Dallas—To Central Bitulithic Co., Praetorian Bldg., Class A, 2 in. on 5 and 6 in. base surfacing 14,345 sq.yd. Fleming Ave., $47,839; 840 sq.yd. Federal St., $2,936—to Uvalde Paving Co., Santa Fe Bldg., improved limestone rock asphalt paving 9,300 sq.yd. Fitzhugh Ave., $30,164; 4,500 sq.yd. Carroll Ave., $14,338—to Southern Paving Co., Hattiesburg, Miss., and Chattanooga, Tenn., Uvalde County rock asphalt paving 625 sq.yd. Brooklyn Ave., from Hollywood to Hampton Sts., $2,931; 10,878 sq.yd. Brooklyn Ave. from Hampton to Ravinia Sts., $39,543; 6,350 sq.yd. Harwood St., $25,392—to H. L. Cannaday Co., 1122 South Lewis St., Tulsa, Okla., 2½ in. vertical fibre brick paving 2,650 sq.yd. Ross Ave., $9,265; 1,260 sq.yd. Collin St., $4,913; 9,126 sq.yd. Gaston Ave., $31,852—to Wooldridge Constr. Co., Dallas, Class C, 6 in. concrete paving 1,790 sq.yd. Meadow St., $4,493; 2,470 sq.yd. Concho St., $6,188—to Peacock & Childers, 415 sq.yd. Center St., $1,162; 515 sq.yd. Garret Ave., $1,417; 7,700 sq.yd. McCommas Ave., $19,101; 1,960 sq.yd. Lake Cliff Dr., $5,169. Grand total $246,703.

Tex., Fort Worth—Concrete paving 2.21 mi. Akers Rd. from Sylvania Ave. east to Grapevine Cardinal, 18 ft., to West Texas Constr. Co., 501 East Rosedale Ave., $61,647. Est. $70,000.

Tex., Fort Worth—Concrete surfacing 2¼ mi. Akers Rd., to West Texas Constr. Co., 501 East Rosedale St., $46,037.

Tex., Mt. Pleasant—City, 2 in. asphalt on 8 in. caliche and rock base paving 50 blocks residential and business sections, 30 to 40 ft... to Brown & Root, Corpus Christi, and Georgetown, $160,000.

Tex., San Saba—Paving Wallace, Live Oak, Cherokee, High, Clear, Commerce, Story, 7th and Lafayette Sts., to West Texas Constr. Co., Abilene, $175,000.

Utah, Tooele—City Council, grading, curbing, guttering, concrete paving Main and Vine Sts., to Christensen & Gardner, Salt Lake City, $27,995. Est. $30,000.

Wash., Seattle—Bd. P. Wks., grading, concrete walks on Brandon St., to R. J. Odman, 7100 55th Ave. S., $24,262. Est. $28,856. Noted Sept. 4.

Wis., Milwaukee—City, to Blech Constr. Co., 1537 Sherman Blvd., paving alley between West Lincoln and West Hayes Aves., $1,257; alley between West Poe and West Ruskin Sts., $5,629; North 33rd St., $7,797; West Carter Pl., $2,499—to Schwerm Bros., 1703 Weil St., North 58th St., $312; 64th St., $1,730—to W. F. Hunt, 44 Broadway, 6th Street Viaduct $11,106. Grand total $30,329.

Ont., Hagersville—Haldimand Co., asphaltic macadam paving 2 mi., to Dufferin Paving & Crushed Stone Co. Ltd., foot Bathurst St., Toronto. Est. $30,000.

Ont., Oshawa — Concrete sidewalks on 18 streets, $7,877; concrete paving 12 streets $68,462, day labor. W. C. Smith, City Offices, engr.

Ont., Sandwich — Town Council, resurfacing Sandwich St., to Canada Paving & Supply Corp., Sandwich St. E., Windsor, $13,800 — asphalt paving Tecumseh Rd. and Melbourne Ave., to H. I. Bondy, 31 Bridge St., Windsor, $12,780; concrete sidewalks on Rankin St. and Melbourne Ave., to A. A. Forster, 224 Josephine St., Windsor, $4,000. Grand total $30,580.

Ont., Toronto—Concrete paving lane near Broadview and Sheridan Aves., to E. Mark, 26 Beaver Ave., $7,029 and $1,491 respectively—bitulithic paving Briar Hill Ave. and Orchard View Blvd., to Asphaltic Concrete Paving Co. Ltd., Sun Life Bldg., Toronto, $14,761 and $7,091 respectively—asphalt paving Glenview Ave. and Golfdale Rd., to Godson Contg. Co. Ltd., 203 Richmond St. W., $7,392 and $11,756 respectively. Grand total $49,520. Noted Sept. 5 Daily.

Ont., Toronto—City Council, City Hall, asphalt paving New St., to Kilmer & Barber Ltd., Harbor Commissioners Bldg., $68,786 — St. Johns Pl., to Constructing & Paving Co. Ltd., Confederation Life Bldg., $2,487—Chatsworth Dr., to Godson Contg. Co. Ltd., 203 Richmond St. W., $4,434—concrete paving 2 lanes, to Certified Concrete Co., 16 Endeau Ave., $5,765. Grand total $81,472. Noted Sept. 19.

EXCAVATION, DRAINAGE, IRRIGATION, LEVEES, RIVER AND HARBOR

PROPOSED WORK

Calif., Bakersfield—Kern Co., artificial lake in connection with Kern River Park development, incl. 100,000 cu.yd. earth levees and embankment, 1,700 lin.ft. pipe line, $30,000. H. Gilkey, 337 17th St., Oakland, landscape engr.

Calif., Newport Beach—Groynes along beach front at 36th St. $100,000. R. L. Patterson, city engr.

Conn., Hartford—City, Bd. Contr. & Supply, constructing dike, Commerce St. $400,000. R. Clark, City Hall, engr.

Conn., Hartford—City, Bd. Contr. & Supply, brick, concrete, steel pumping station at South Meadows to prevent flooding. $145,000. R. Clark, City Hall, engr.

Mass., Newburyport — Commonwealth of Massachusetts, Boston, breakwater, Merrimack River, $25,000 or more. A. W. Dean, Dpt. P. Wks., Boston, engr.

La., Opelousas—Prairie Basse Gravity Drainage Dist., A. Roy, secy. St. Landry Parish, postponed taking bids 35 mi. 6 to 30 ft. bottom width drainage canals incl. 600,000 cu.yd. excav. M. J. Goudeau, Opelousas, engr. Noted Sept. 11.

Wash., Wenatchee — Howard Flat Dist., irrigation project, incl. 11,000 g.p.m. electric pumping plant; 5 mi. 30 in. steel supply line; 31,100 lin.ft. 6- to 22-in. steel pipe. $300,000 voted. W. T. Batcheller, Dexter Horton Bldg., Seattle, engr.

BIDS ASKED

Ia., Muscatine — Oct. 18, by Bd. Comrs. Muscatine Co., cleaning out Drainage Sub-Dist. 1 of D. D. 2, incl. 10,300 ft. ditch work, 5,207 cu.yd. excav.

Michigan—Oct. 22, by L. N. Jones, resident engr., Crystal Falls, constructing 2.027 mi. ditch, MO27-13 C-1 and MO66-31 C-1, Gogebic and Ontonagon Counties, for State Hy. Comn., Lansing.

Tex., Edinburg—Oct. 15, by Bd. Hidalgo Co. Water Impvt. Dist. 6, 400,000 sq.ft. canal lining, 36,100 ft. 12- to 30-in. underground pipe, 18 manholes, 44 meters, 31 vents, 3 pumps and 3 pump houses. $160,000. Address District Manager. Noted Oct. 2.

Ont., Sault Ste. Marie — Oct. 10, by N. Desjardins, secy., Dpt. P.-Wks., Ottawa, dredging $30,000.

CONTRACTS AWARDED

Calif., Los Angeles—City Harbor Dpt., suction dredging 111,000 cu.yd., incl. disposal outside pierhead lines, to Standard Dredging Co., Central Bldg., $32,190.

Calif., Richmond—Berkeley Waterfront Co., c/o R. A. Beebee, engr., 1 Montgomery St., San Francisco, 13,000 ft. rock wall, involving 250,000 tons rock from site Ford Motor Car Plant in Richmond to Point Isabella, to Daniel Contg. Co., 503 Market St., San Francisco. Above contractor let sub-contract for 200,000 cu.yd. dredging in connection with same project, to Bundesen & Lauritzen, Pittsburg. Noted Sept. 11.

Illinois — Bd. Comrs. Union D.D. 1, Montgomery Co. (Boise) and Macoupin Co. (Girard) at Town Hall, Farmersville, cleaning out and deepening main ditch and 4 laterals, incl. 25,000 cu.yd. excav., to W. Loyt, Simmons, Mason City. Noted Sept. 11.

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Excavation, Drainage, Irrigation, Levees, River and Harbor (Continued)

La., Shreveport — Bd. Comrs. Caddo Levee Dist., Court House, to H. N. Moody, 815 Perdido St., New Orleans, Red River Bank Impvt., 2,810 lin.ft. Havana Bend, $15,600; to E. L. McCain, Shreveport, 200 lin.ft. permeable 3 row pile timber structure and repairs to 1,000 ft. old structure, Corner Place Bend $8,700, 350 ft. bank repairs, Cairo Bend $5,500, rebuilding 18 bents, repairing 54 bents, White Hall Bend $9,500; to Woods Bros. Constr. Co., 132 South 13th St., Lincoln, Neb., 550 ft. pile timber deflection dykes, Cash Point Bend $805, building up, straightening 7 current retards, rebuilding 3 headers, Twelve Mile Bayou Bend $11,500, repairing 1,930 lin.ft. bank protection, Shreves Island Bend $2,000. Grand total $53,605. Noted Sept. 11.

Miss., Indianola — Bd. Comrs, Beaver Dam Drainage Dist., Sunflower Co., improvements, to G. S. Funk, Shelby. Noted Sept. 25.

Ore., Redmond — Central Oregon Irrigation Dist., flume, incl. 1,878 ft. creosoted wood stave pipe, 420 cu.yd. concrete, 125,000 ft. timber, to Kern & Kibbe, 290 East Salmon St., Portland, $30,000.

Ontario—Dpt. P. Wks., N. Desjardins, secy., Ottawa, pier repairs at Leamington, to Chatham Dredging Co., 16 Llewellyn St., Chatham, $16,188; reconstructing revetment wall, Saugeen River, to G. L. Campbell, Midland, $18,439; landing wharf, to Considine-Reed Ltd., Bank of Montreal Bldg., Windsor, $21,375; reconstructing wharf at Waubausheme, to C. M. Morssen, 40 Springs Grove, Montreal, Que., $8,257; reconstructing wharf at Penetang, to A. C. Ferguson, Gravehurst, and J. B. Johnston, Orillia, $8,371. Grand total $72,630.

Ontario—Dpt. P. Wks., Parliament Bldgs., Ottawa, dredging Burlington Channel, to R. C. Huffman Constr. Co., 331 Bay St., Toronto, $123,742.

Ont., Toronto — Dpt. P. Wks., Parliament Bldgs., Ottawa, dredging south end Don River, to Russell Constr. Co. Ltd., Harbor Commission Bldg., Toronto, at $1.19 per cu.yd. Est. $26,700.

Public Bond Elections

Coming Bond Elections

Watermains and Equipment—Hayward, Calif., Castro Valley Water Dist., $150,000.
Waterworks—Clinton, La., Oct. 14, $27,500.
Waterworks — St. Paul, Minn., November, $500,000.
Waterworks—Mangum, Okla., Oct. 14, $108,000.
Waterworks Impvts.—Thorndale, Tex., Oct. 9, $40,000.
Waterworks Impvts.—Midvale, Utah, $125,000.
Sanitary Sewers—Los Angeles, Calif., Nov. 4, $5,050,000.
Sewers—Baton Rouge, La., Oct. 21, $290,000.
Sewage Disposal Plant—Kingfisher, Okla., Oct. 14, $30,000.
Sewers—McKeesport, Pa., Nov. 4, $600,000.
Bridges—Napa, Calif., $40,000.
Viaduct—Kansas City, Mo., November, $25,000.
Irrigation Work—Calif., El Nido Irrigation Dist., $135,000.
Excavation and Straightening Brush Creek — Kansas City, Mo., November, $25,000.
Power Development, Transmission Lines, etc.—Los Angeles, Calif., Nov. 4, $13,000,000.
Court House—Menard County, Tex., Oct. 18, $80,000.
School — Canton Township, Ohio, November, $165,000
School—Mi hillen Township (Canton), Ohio, Novembe $150,000.
Junior Hig. School—Vallejo, Calif., $230,000.
Junior High School Add.—Parma, O., Nov. 4, $425,000.
Stadium and Theatre—Kansas City, Mo., November, $150,000.
Zoological Garden—Kansas City, Mo., November, $2,000,000.

Bonds Voted

Reservoir — Augusta, Kan., $130,000, C. A. Haskins, Kansas City, Mo., Engr.
Waterworks Impvts. — Collierville, Tenn., $30,000.
Waterworks Impvts.—Brawley, Calif., $180,000.
Airport—Greenville, Miss., $30,000.

FEDERAL GOVERNMENT

PROPOSED WORK

Massachusetts—STATIONS—Treas. Dpt., at office Sup. Archt., sketches coast guard stations at Provincetown and North Truro. E. Santangini, 408 Atlantic Ave., Boston, assoc. engr.

Miss., Vicksburg—LEVEE—U. S. Eng., 63,000 cu.yd. levee work in Mississippi River.

N. Y., Fort Wadsworth—QUARTERS—Con. Q.M. rejected bids Sept. 22, 4 houses for noncommissioned officers quarters. Will revise plans. Noted Aug. 28.

N. Y., Oswego—BREAKWATER—U. S. Eng., Buffalo, 2,200 ft. breakwater in Oswego Harbor.

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Pa., Lewisburg—Dpt. Justice plans by A. Hopkins & Associates, 415 Lexington Ave., New York, and soon takes bids federal penitentiary.

S. C., Spartanburg—POST OFFICE—Treas. Dpt. at office Sup. Archt., 3 story post office, $350,000.

Tenn., Memphis—LEVEE—U. S. Eng. 1,960,000 cu.yd. levee work in Little River Drainage Dist.

BIDS ASKED

Calif., Palo Alto — WATER SOFTENER — Oct. 20, by W. Radcliffe, superv. Supt. Constr., U. S. Veteran's Hospital, one 1,250 gal. per hr. continuous cold process lime-soda water softener complete; steel or Calif. redwood settling tank, 8 ft. in diam., 17 ft. high.

Conn., Hartford—STOREHOUSE—Oct. 28, by Vet. Bur., 1 storehouse at U. S. Veteran's Hospital.

D. C., Wash.—PIPE FITTINGS—Oct. 14, by Bur. Supplies & Accounts, pipe fittings, steel floor plates.

Ga., Atlanta — DAIRY — See "Contracts Awarded."

Illinois—LEVEE—Oct. 29, by U. S. Eng., 428 Custom House, St. Louis, Mo., placing 620,000 cu.yd. earthwork for rebuilding, enlarging levee of Little Creek Levee and Drainage Dist., Brown Co., on Illinois River; adv. E. N.-R. Oct. 9.

Ill., Streator—POST OFFICE—Oct. 21, by Treas. Dpt. at office Sup. Archt., remodeling, enlarging U. S. Post Office.

Kan., Fort Riley—QUARTERS—Nov. 5, at office Con. Q. M., 9 sets double non-commissioned officers' quarters; adv. E. N.-R. Oct. 9.

Ky., Lexington—STOREHOUSE—Oct. 28, by Vet. Bur., 1 storehouse at U. S. Veteran's Hospital.

Mich., Selfridge Field—SEAWALL, etc.—Oct. 28, by Con. Q. M., seawall, ramp, hydraulic fill, grading, drains; adv. E. N.-R. Oct. 9.

Mich., Selfridge Field—STEEL TANK—Oct. 23, by U. S. Eng., one 200,000 gal. steel tank on 75 ft. trestle.

Miss., Vicksburg—LEVEE WORK—U. S. Eng. Office, taking bids 298,000 cu.yd. levee work in Mississippi River.

Mont., Lewistown—POST OFFICE—Oct. 31, by Treas. Dpt. at office Sup. Archt., constructing U. S. Post Office.

Neb., Lincoln—STOREHOUSE, etc.—Oct. 21, by Vet. Bur., storehouse building, paving, grading at U. S. Veteran's Hospital.

N. Y., Brooklyn—GENERATOR—Oct. 28, by Signal Supply Officer, New York General Depot, 58th St. and 1st Ave., generator, headset.

N. Y., Brooklyn — MOTORS — Oct. 30, by Signal Supply Officer, Signal Sect., New York General Depot, 58th St. and 1st Ave., Brooklyn, motors, time interval apparatus.

O., La Carne—HOSPITAL—Oct. 30, at office Con. Q. M., constructing, completing post hospital building; adv. E. N.-R. Oct. 9.

Pa., Pittsburgh—BANK—Oct. 15, by Federal Reserve Bank, M. J. Fleming, East 6th St. and Superior Ave., Cleveland, O., 8 story, basement, 75 x 197 ft., brick, steel, Grant St. from Ogle to Wm. Penn Ways. Walker & Weeks, 2341 Carnegie Ave., Cleveland, O., archts. Eric Fisher Wood & H. Hornsbostel, Hardy & Hayes Bldg., assoc. archts. Noted Jan. 23.

R. I., Pawtucket—POST OFFICE—Oct. 28, by Treas. Dpt. at office Sup. Archt., U. S. Post Office; adv. E. N.-R. Oct. 9.

S. C., Parris Island—ALTERING—Spec. 6241—Oct. 15, by Yards & Docks, Navy Dpt., altering buildings at Marine Barracks.

Texas—JETTY—Nov. 20, by U. S. Eng., Galveston, repairing Sabine Pass, incl. placing 9,000 tons cap stone, 13,000 tons core stone, picking up and replacing 3,000 cap stones; adv. E. N.-R. Oct. 9. Noted Sept. 18.

Tex., Randolph Field—CABLE—Oct. 27, at office Con. Q. M., 250,000 ft. cable for underground electric distribution system; adv. E. N.-R. Oct. 9.

Tex., San Antonio — DEPOT SHOPS — Con. Q. M., bids about Mar. 1, steel, concrete depot shops, at Duncan Field, near here.

Tex., San Antonio—HANGARS—Con. Q. M., bids about Mar. 1, 3 standard steel hangars at Duncan Field. Noted Oct. 10, 1929.

Utah, Ogden—ELEVATOR PLANT—Oct. 22, by Treas. Dpt. at office Sup. Archt., elevator plant in present post office.

CONTRACTS AWARDED

Ark., El Dorado — FEDERAL and POST OFFICE — Treas. Dpt. at office Sup. Archt., federal and post office building, Main and Jackson Sts., to W. B. Smith, El Dorado, $362,347. Noted Aug. 7.

Colorado—ROAD—Bureau P. Rds., Custom House, grading 10.86 mi. Fall River Natl. Park Hy., to L. T. Lawler, Butte, Mont., $437,178. Noted Sept. 4.

Conn., Newington—DISPOSAL PLANT—Vet. Bu., Arlington Bldg., sewage disposal plant, to Mechanical Eng. & Constr. Co., Mills Bldg., Wash., D. C., $40,775. Noted Aug. 14.

D. C., Wash.—SEAPLANES—U. S. Coast Guard, 8 seaplanes, to Fokker Aircraft Co., General Motors Bldg., New York, $316,696 without motors and radio.

Fla., Pensacola—BOILERS, etc.—Spec. 6185—Yards & Docks, Navy Dpt., boilers, oil burners, flue, to Columbia Contg. Co., 401 Bway., New York, $59,442 (180 days). Noted Sept. 4.

Ga., Atlanta—DAIRY—Dpt. Justice, Federal Prison, four 1 story, 34 x 100 ft. cow barns, 1 story, 30 x 80 ft. milking barn and 24 x 50 ft. milk house, Panthersville Honor Farm, near here, day labor.

Mass., Boston — COALING PLANT — Treas. Dpt. at office Sup. Archt., coaling plant, to D. Feinberg, 165 Terrace St., Roxbury, $6,495.

Mo., Jefferson Barracks—ROADS—Vet. Bur., improving roads at U. S. Vet. Hospital, to Asphalt Paving Co., 1328 Sublette St., St. Louis, $13,254. Noted Aug. 7.

N. Y., Mineola—QUARTERS—Con. Q. M., Mitchel Field, 6 field officers' quarters and 40 company officers' quarters, to Supreme Constr. Co., 122 East 42nd St., New York, $660,000 Noted Aug. 28.

N. Y., New York—DREDGING—U. S. Eng. Army Bldg., 30 Whitehall St., dredging 24,150 cu.yd. material other than ledge rock and 93,055 cu.yd. ledge rock in East River, to Arundel Corp., foot Fulton St., Brooklyn. Noted Aug. 21.

N. Y., New York — ELEVATOR PLANT — Treas. Dpt. at office Sup. Archt., elevator plant at Assay Office, to Gurney Elevator Co., 109 West 64th St., $59,060.

Pa., Carlisle Barracks—MESS HALL—Con. Q.M., mess hall, to N. C. Nelson, Inc., 853 Bway., New York, $99,186. Noted Sept. 11.

Pa., Washington — REMODELING, etc. — Treas. Dpt. at office Sup. Archt., remodeling, enlarging U. S. Post Office, to C. Weitz's Sons, Des Moines, Ia., $20,700. Noted Sept. 24.

R. I., Melville—EQUIPMENT—Spec. 5715—Yards & Docks, Navy Dpt., power plant equipment, to Industrial Heating & Eng. Co., 490 Bway., Milwaukee, Wis., $88,867 (240 days). Noted Sept. 4.

R. I., Providence—DREDGING—U. S. Eng., 1,230,400 cu.yd. in harbor, to J. S. Packard Dredging Co., Turks Head Bldg., Providence, at $0.174 per cu.yd., total $214,089. Noted Aug. 21.

Tex., Randolph Field—GAS DISTRIBUTION—Con. Q.M., natural gas distribution system, to Kirkwood, Wharton & Lee, 518 North Flores St., San Antonio, $50,189. Noted Aug. 14.

Wyoming—ROAD—Pub. Rds., Custom House, Denver, Colo., grading 7.222 mi. Granite Creek-Shell Natl. Forest Rd., Big Horn Natl. Forest, Big Horn Co., to Taggart Constr. Co., Cody, $51,113. Noted Sept. 4.

FERERAL POWER COMMISSION

Applications for License and Permits

1105 — Great Northern Power Co., Seattle, Wash., wants preliminary permit power project on Sultan, East Wallace, Olney, and north fork Skykomish Rivers, West Cady and Troublesome Creeks, within Snoqualmie Natl. Forest, Snohomish Co.

1106 — R. H. L. Buller, Rockport, Wash., wants license power project on Joe Perrault Creek, with Mount Baker Natl. Forest, Skagit Co.

1107—City of Ashland, Ashland, Ore., wants license power project on Ashland Creek, within Crater Natl. Forest, Jackson Co.

1114—Booth Fisheries Co., 600 Marion Bldg., Seattle, Wash., wants license constructed power project in Orca Creek, in Chugach Natl. Forest, Alaska.

1115—E. L. Wright, Weitchpec, Calif., wants license power project on Cinder Cap Creek, in Humboldt Co., within Klamath Natl. Forest.

1116—California Oregon Power Co., 58 Sutter St., San Francisco, Calif., wants license constructed transmission line in Josephine Co., Ore.

1117—Central Power & Light Co., Frost Natl. Bank Bldg., San Antonio, Tex., wants license power project on Guadalupe River in Victoria and DeWitt Counties.

1118 — Montana Power Co., Butte, Mont., wants license transmission line partly within Jefferson Natl. Forest, Cascade Co.

1119—Muskingum Coffin Co., 108 Main St., Zanesville, O., wants license constructed power project on Muskingum River, Muskingum Co.

1120—Arizona Power Co., Prescott, Ariz., wants license partly constructed transmission line crossing land within Prescott Natl. Forest, Yavapai Co.

1121—Pacific Gas & Electric Co., 245 Market St., San Francisco, Calif., wants license constructed project partly on public lands on North and South Forks of Battle Creek, in Shasta and Tehama Counties.

1122 — Grimes Pass Power Co., 424 Idaho Building, Boise, Idaho, wants license constructed transmission line partly within Boise and Payette Natl. Forests and partly on public land in Boise Co.

1123—Southern Sierras Power Co., Riverside, Calif., wants license constructed transmission lines within San Bernardino Natl. Forest in San Bernardino Co.

RAILWAYS

BIDS ASKED

Indiana—See "Contracts Awarded."

CONTRACTS AWARDED

Indiana—New York Central R.R. Co., 466 Lexington Ave., New York, F. B. Freeman, ch. engr., 2 new turn tables at Elkhart, own forces, $125,000.

Railways (Continued)

Ontario — Dpt. P. Wks., Parliament Bldgs., Otawa, grading 55,000 cu.yd. and 9 mi. track ballasting in connection with Prescott Elevator, in Prescott, to Kendall Bros., Ltd., 261 Esplanade East, Toronto. Est. $35,000.

SUBWAYS AND TUNNELS

BIDS ASKED

N. Y., Long Island City—Oct. 14, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, constructing Sect. 6, Route 108, Rapid Transit R.R. along and under Queens Blvd. from 55th Ave. to 64th Rd.

CONTRACTS AWARDED

Ont., East Windsor — Town and Canadian Natl. Rys., New Union Sta., Toronto, general contract subway under railroad tracks with approaches, to Canada Paving & Supply Corp., Sandwich St. E., Windsor, $178,048; steel, to Canadian Bridge Co., Ltd., Walker Rd., Walkerville, $89,050; mechanical work, to Fuel Savings & Supply Corp., 1436 Howard Ave., Windsor, $8,600; electrical work, to Walkerville Hydro-Electric System, 102 Wyandotte St., $7,450. Grand total $284,148. Noted Sept. 11.

GRADE CROSSINGS

PROPOSED WORK

Calif., Newport Beach—City and Orange Co. overhead crossing at The Arches. $200,000. R. L. Patterson, city engr.

N. J., Wallington — Erie R.R. Co., G. S. Fanning, ch. engr., 50 Church St., New York, and State Hy. Comn., Trenton, eliminating grade crossing on Main Ave. $77,300.

Ont., Stratford—City and Canadian Natl Rys., C. S. Gzowski, ch. engr. constr., Montreal, Que., subway under tracks at Erie St. $80,000. W. H. Riehl, city engr.

BIDS ASKED

Arizona—Oct. 14, by State Hy. Comn., Phoenix, railroad overpass, approaches on Florence-Tucson Hy., Pima Co. W. W. Lane, state hy. engr.

Ill., Chicago—See "Streets and Roads."

Okla., Oklahoma City — Oct. 14, by J. W. Berry, clk. Oklahoma Co., Reno Ave. Underpass. $55,000. J. E. Frazier, Court House, engr.

Ont., Oshawa—Oct. 13, by City and Canadian Natl. Rys., T. T. Irving, pres., New Union Sta., Toronto, subway on Simcoe St. S., under railway tracks, incl. 60 ft. roadway, concrete piers, abutments, retaining walls. $250,000. Noted Sept. 18.

PIERS AND WHARVES

PROPOSED WORK

N. J., Bradley Beach—PIER—Bd. Boro Comrs., Boro Hall, timber, concrete fishing pier. $25,000.

AIRPORTS

BIDS ASKED

Fla., Plant City—See "Contracts Awarded."

Massachusetts—Massachusetts Air Terminal & Arena taking bids grading for airport, Fisker Meadows, off Neponset St. Total est. $1,000,000. Noted Aug. 28.

CONTRACTS AWARDED

Fla., Plant City—City of Miami, erecting steel for hangar, to Virginia Bridge & Iron Co., Roanoke, Va., metal covering, to H. H. Robertson Co.; all other work by own forces. Total est. $26,000.

POWER AND LIGHTING

PROPOSED WORK

Calif., Woodland—City postponed indefinitely ornamental street lighting system. Noted Sept. 18.

W. Va., Wierton—See "Factories and Mills."

Ont., Hamilton—Hydro-Electric Power Comn. of Toronto, 190 University Ave., 110,000 volt transmisson line, steel towers, from Beach Rd., to Stirton St. substation. $400,000. F. A. Gaby, 190 University Ave., Toronto, engr.

BIDS ASKED

Mass., Boston — Oct. 15, by City, Dpt. P. Wks., lights, cables for Longfellow Bridges over Charles River Basin. J. A. Rourke, comr. Dpt. P. Wks.

SPORTS AND PARKS

PROPOSED WORK

Calif., Los Angeles—Los Angeles City School Dist. plans 50 x 60 ft. and 60 x 75 ft. rein.-con. swimming pools, chlorination and heating plants. Austin & Ashley, Chamber of Commerce Bldg., archts.

Mass., Boston — City, Dpt. P. Wks., playground, Washington St. and Dunbar Ave., Dorchester. $25,000-$30,000. J. A. Rourke, comr.

Mass., Brookline—Town, Park Dpt., municipal golf course, Putterhan playground. $243,450 appropriated. Engineer not selected.

Mass., South Weymouth — Town of Weymouth, J. Kelley, chn. com., municipal golf course off Green St. Est. exceeds $25,000. Engineer not selected.

N. J., Spring Lake — See "Buildings — Unclassified."

BIDS ASKED

Calif., Huntington Beach—Oct. 13, by Trustees Huntington Beach High School, rein.-con. swimming pool with filtration and chlorination systems. $40,000 available.

Tex., San Antonio — Longhorn Amusement Park, Inc., c/o T. K. Crossland, pres., Concepsion Rd., and Mitchell St., bids about Oct. 20, 1 story, sports stadium, 8,000 seating capacity. Phelps & DeWees, Gunter Bldg., archts.

HEATING AND VENTILATING

BIDS ASKED

Ind., Indianapolis—Oct. 14, by Bd. School Comrs., unit heaters and complete installation at Arsenal Technical School, 1500 East Michigan St.; thermostats and radiators for School 57, East Washington St. and Ritter Ave. $1,000 each. A. B. Good, 150 North Meridian St., dir.

CONTRACTS AWARDED

Mass., Cambridge—Harvard University, heating in Dormitory and Masters House, "Kirkland House," to Merrill Co., 98 Granite St., South Boston; plumbing, to J. S. Cassedy, 133 Austin St., Cambridge; electrical work, to Lord Electric Co., 301 Columbus Ave., Boston. Est. exceeds $25,000. Noted Sept. 11 under "Schools."

Mass., Dartmouth — Sol-E-Mar Hospital Corp., A. Jones, chn. Building Com., heating in hospital addition, Dartmouth St., to Anderson & Olson, 147 Chancery St.; plumbing, to J. Coholan, 703 South Water St.; electrical work, to E. Howarth & Co., 278 Union St., all in New Bedford. Est. $25,000 or more. Noted Aug. 28 under "Hospitals."

UNCLASSIFIED

PROPOSED WORK

Ill., East St. Louis—MARINE TERMINALS—Phillips Petroleum Co., 6291 Suburban Ave., St. Louis, Mo., marine terminals for gasoline pipe line here in conjunction with pipe line from Texas and Oklahoma to St. Louis, Mo., and East St. Louis. $1,500,000.

Ind., Crown Point—TELEPHONE IMPROVEMENTS—Crown Point Telephone Co., expending $110,000, improvements.

Mass., Dorchester (sta. Boston)—SHIP and RAILROAD TERMINAL — American International Eng. & Equipment Assoc. Syndicate, c/o J. H. Hodsdon, engr., 53 State St., Boston, preliminary plans ship and railroad terminal, incl. 9 buildings, 4 piers, railroad yard, viaducts and dredging, brick, rein.-con., steel construction, at Mt. Vernon St. "Cow Pasture."

Mass., Wenham — GREENHOUSES — H. B. McKean, plans by J. D. Leland Co., Statler Bldg., Boston, two 1 story, brick, concrete, greenhouses, potting shed, etc. $25,000 or more.

N. Y., Brooklyn — COAL POCKETS — Hart Place Realty Corp., Hart Pl. and Neptune Ave., plans by Fanning-Schuett Eng. Co., engrs. and archts., 4325 North 3rd St., Phila., Pa., 2 story, 50 x 50 ft. coal pockets, Hart Pl. and Neptune Ave. $25,000.

Oklahoma — PIPE LINE — Eason Oil Co., Enid, W. Eason, pres., 35 mi. 6 in. oil pipe line from Oklahoma City to Lowell. $75,000. Private plans.

R. I., Newport — BUS TERMINAL — Shore Line Bus Co., W. H. Vanderbilt, pres., revised plans by E. M. Corbett, 167 Bedford St., Fall River, Mass., brick, steel, plain found., Spring St. $50,000. Former bids rejected. Noted June 12.

BIDS ASKED

N. J., Woodbine—ASH HANDLING EQUIPMENT—Oct. 14, by Dpt. Institutions & Agencies, State Office Bldg., Trenton, ash handling and storage equipment at State Colony for Feeble Minded Males. $5,000. C. N. Leathem, Jr., state archt.

N. Y., Dannemora—METAL STAIRS—Oct. 23, by Commissioner Correction, State Office Bldg., Albany, metal stairs in Ward Building, Dannemora State Hospital; adv. E. N.-R. Oct. 9.

Tex., San Antonio—MARKET HOUSE—City, c/o J. Rubiola, comr., taking bids furnishing, installing new refrigerating unit in old municipal market house. $30,000. I. Ewig, City Hall, city engr.

Tex., Denton—ICE PLANT MACHINERY—Oct. 10, by City, installing machinery for municipal ice plant. $50,000. W. N. Harris, Denton, engr. Noted July 3 under "Factories and Mills."

CONTRACTS AWARDED

Ariz., Flagstaff—ENCAMPMENT—State, 18 mess halls, administration building, power and guard houses, at Fort Alex. M. Tuthill, near here, to H. R. Meadows, Phoenix, $58,887; 3 latrines, to Clinton Campbell, Phoenix, $13,990; warehouse, water and sewerage systems, to McGinty Constr. Co., Phoenix, $31,016; electrical distribution, to C. W. Brown, Phoenix, $4,525; infirmary, to W. H. Brown, Phoenix, $2,340. Grand total $110,758.

Ind., Indianapolis—TRESTLE, etc.—Eli Lilly Co., 740 South Alabama St., concrete trestle, unloading platform, to Leslie Colvin, Continental Bank Bldg., $25,000.

Mass., Worcester—BUNK HOUSE—Boston & Maine R.R. Co., W. J. Backes, ch. engr., Boston, bunk house, fan house, locomotive washing facilities, other equipment, to H. Wales Lines Co., 134 State St., Meriden, Conn. Est. exceeds $25,000.

Mo., Kansas City—TUNNEL—Kansas City Terminal Ry. Co., Union Sta., 248 ft. mail tunnel, 13 ft. high to connect new post office building with Union Station, to List & Weatherly Constr. Co., Railway Exch. Bldg. Est. $65,000.

N. Y., Attica—CELL BLOCK—Commissioner Correction, State Office Bldg., Albany, Cell Block B, New Attica State Prison, to J. J. Johnson Constr. Co., Inc., 207 West Huron St., Buffalo, $372,990; heating, to Chippewa Plumbing Co., Inc., 279 Chicago St., Buffalo, $19,846; sanitary work, to Bareham & McFarland, Inc., 156 North St., Rochester, $75,892; electrical work, to F. A. Mott Electric Co., 196 Chestnut St., Rochester, $35,590. Grand total $504,118. Noted Sept. 11.

N. Y., Brooklyn — METAL CHEMICAL TANKS—Kings County Lighting Co., 6740 4th Ave., metal chemical tanks, 1st Ave. and 55th St., to Western Gas Constr. Co., Fort Wayne, Ind., $50,000. Noted Sept. 25.

Tex., Jasper — FISH HATCHERY — Texas Game & Oyster Comn., c/o J. Trecker, fish hatchery, incl. large number concrete pools, to C. L. Flourney, Jasper, $35,000. Noted Sept. 4.

MATERIALS

BIDS ASKED

WIRE—**Spokane, Wash.**—Oct. 16, by C. T. Bogart, city purch. agt., 11,400 ft. R.C. wire, 3,400 ft. 9-conductor, 10 Ga. lead-sheathed cable.

GRAVEL—**West Virginia**—See "Streets and Roads."

CONTRACTS AWARDED

CEMENT—**Los Angeles, Calif.**—Los Angeles Co., 3,800 bbl. portland cement, f.o.b. siding at Azusa, 785 bbl. f.o.b. Glendora in connection Little Dalton Wash Storm Drain Project, to Monolith Portland Cement Co., Bartlett Bldg., at $2.40 per bbl.

CABLE—**Pasadena, Calif.**—City, lead covered copper cable for municipal light and power dpt., to Standard Underground Cable Co., 939 East 14th St., Los Angeles, $34,000.

PIPE—**Milwaukee, Wis.**—City, J. W. Nicholson, purch. agt., 1,000 tons 16 in. Class "C" water pipe, to Glamorgan Pipe & Fdry. Co., 122 South Michigan St., Chicago, Ill., $44,400 less 2%.

EQUIPMENT

PROPOSED WORK

CRANE and HOIST—**Pasadena, Calif.**—City rejected bids electrically operated crane and hoist for Municipal Light and Power Dpt. Will revise plans.

BIDS ASKED

FIRE HYDRANTS—**Boston, Mass.**—Oct. 10, by Dpt. P. Wks., assembling fire hydrants for water service. $5,000 or more. J. A. Rourke, comr. Dpt. P. Wks.

FRAMES, etc.—**Boston, Mass.**—Oct. 15, by Supply Dpt., frames, ornamental sections, etc., for street signs. $5,000. **P. A. Chapman, supt.** Supply Dpt.

GASOLINE HOISTER—**Edgartown, Mass.**—P. O. Box 263, in market gasoline hoister.

GRADERS—**Minneapolis, Minn.**—Oct. 14, by F. S. Gram, city purch. agt., 6 motor patrol graders and three 10 hp. tractors. N. W. Elsberg, city engr.

GRADER—**Olivia, Minn.**—Oct. 1, by L. Schmidt, aud. Renville Co., 1 motor patrol grader.

PLATFORM HOIST—**Elmhurst, N. Y.**—Oct. 14, by W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. extension and Concord St., Brooklyn, electric platform hoist for addition to Newtown High School, on block bounded by 90th and 91st Sts., 48th and 50th Aves., for Bd. Educ., 500 Park Ave., New York.

EXCAVATOR, etc.—**Long Island City, N. Y.**—Oct. 14, by G. U. Harvey, pres. Queens Boro. Queens Subway Bldg., 1 excavator for road and street grading; also 2 oil distributors to Bureau Hys.

BOILER TUBES and STEEL—**Phila., Pa.**—Oct. 15, by C. E. Walsh, 15 North 32nd St., Contr. 26-1930 boiler utbes; Contr. 27-1930 structural steel.

CONTRACTS AWARDED

BOILERS—**Boston, Mass.**—Dpt. P. Buildings, J. P. Englert, supt., furnishing 2 horizontal boilers for Suffolk Co. Court House, Pemberton Sq., to J. P. Dwyer Co., 254 Harrison Ave., $8,880. Noted Sept. 19.

FOREIGN

Honduras — Government of Honduras, Tegucigalpa, and Honduras National Rys., preliimnary studies railroad from Portrerillos to Comayaugua. Ulen Eng. Corp., 120 Bway., New York, engrs. for surveys.

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Buildings

RESIDENTIAL

BIDS ASKED

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Brooklyn—R. H. Johnston, 205 West 42nd St., New York, soon takes bids separate contracts 15 story, Henry and Cranberry Sts. $2,500,000. H. I. Feldman, 415 Lexington Ave., New York, archt.

CONTRACTS AWARDED

Calif., Los Angeles — Owner, c/o C. W. Powers, archt., Insurance Exch. Bldg., 4 story, basement, 60 x 128 ft., concrete, brick, stone, tile, 814 South Hobart Blvd., to L. M. Halper, Insurance Exch. Bldg., $150,000.

Calif., Los Angeles—W. F. Normandie, 622 Subway Terminal Bldg., 7 story, 50 x 148 ft., rein.-con., steel, ornamental iron, hollow tile, 5542 Fenwood Ave., to Harris-Bowers Co., 318 I. W. Heilman Bldg., $215,000.

Calif., Oakland—R. E. Mayer, 1129 McKinley St., 3 story, timber, stucco, incl. concrete garage, Crescent Ave. and Santa Clara St. $150,000. Owner builds.

Kan., Abilene—A. H. Gentry, archt., 1010 Fairfax Bldg., Kansas City, Mo., 7 story, basement, 100 x 120 ft., rein.-con., brick, stone hotel, for Abilene Hotel Co., Abilene Hotel, $250,000. Owner builds under supervision J. Fargo, supt. constr. Noted Aug. 21.

Me., Presque Isle—H. W. Rhodes, archt., 142 High St., Portland, 3 story, basement hotel, to N. W. Downing, Presque Isle, for Presque Isle Hotels Inc., H. Marriott, pres., West Newton Falls, Mass. Est. $150,000. Noted Mar. 6.

N. Y., Brooklyn—A. Kondar, 624 90th St., 6 story apartments, 93rd St. and Marine Ave., separate contracts, $150,000. W. Freed, 211 Fort Washington Ave., New York, archt.

N. Y., Brooklyn—M. Norman, 590 Utica Ave., 100 x 130 ft. apartments, 52nd St. and Clarkson Ave., separate contracts, $150,000. M. Rothstein, 186 Joralemon St., archt.

N. Y., Brooklyn—Sunnyside Building Corp., 530 West 113th St., New York, 6 story, 84 x 120 ft. apartments, 44th St. and 7th Ave., separate contracts. $200,000. Seelig & Finkelstein, 153 Pierrepont St., archts.

N. Y., Brooklyn—Ten Eyck Apartments, Inc., L. Sakolov, pres., 1600 Kings Highway, 6 story, 90 x 150 ft. apartments, Tennis Court and East 18th St., separate contracts. $300,000. G. I. Prowler, 367 Fulton St., archt.

N. Y., New York—Carder Realty Co., R. A. W. Carleton pres., 151 West 42nd St., 12 story, 100 x 100 ft., 12 East 88th St., to Fred T. Ley, 578 Madison Ave. Est. exceeds $600,000.

N. Y., New York—G. O. Building Corp., G. Olson, pres., Hyland Blvd., Great Kills, 6 story, 82 x 185 ft. apartment, Kenmore Pl. and Woodruff Ave., separate contracts, $180,000. Franklin, Bates & Heindsmann, 2526 Webster Ave., archts.

N. Y., New York—Kindansky & Levy, 424 Madison Ave., 18 story apartments, 7th Ave. near 14th St., separate contracts, $900,000. Owner takes bids about Nov. 1. R. Candela, 578 Madison Ave., archt.

N. Y., New York — New York Deaconess Assn. of Methodist Episcopal Church, 1175 Madison Ave., apartments, church, 1175 Madison Ave., to T. E. Rhoades, 342 Madison Ave. Est. $500,000. Contractor taking bids on separate contracts.

N. Y., New York—One Hundred Fifty-Two West 49th Street Corp., S. Behrman, pres., 570 7th Ave., stores, apartments, to Behrman & Bogel, 570 7th Ave. Est. $150,000. Contractor taking bids on separate contracts. Noted Sept. 25.

N. Y., New York—Two Hundred West 15th Street Corp., M. Weisman, pres., 18 story, 200 West 15th St., to H. Mandel, 10 East 40th St. Est. $500,000. Contractor taking bids about Oct. 30 separate contracts, steel, etc.

CLUBS

PROPOSED WORK

Conn., Manchester — Manchester Y.M.C.A., c/o W. W. Robertson, chn., Manchester, and 347 Madison Ave., New York, sketches by Architectural Bureau of National Council, Y.M.C.A., and Hutchins & French, assoc. archts., 11 Beacon St., Boston, Y.M.C.A. $150,000. Noted Sept. 4.

Mich., Detroit—Smith, Hinchman & Grylls, archts., 800 Marquette Bldg., soon lets contract 3 story, basement, brick, rein.-con. stone club house, East Jefferson Ave., for University Club of Michigan, c/o architects. $300,000. Noted July 17.

Mich., Dearborn—Glover Watson, Inc., 200 Washington Blvd. Bldg., Detroit, plans by W. Mills, 152 South Garfield Ave., Columbus, O., 2 story, brick, concrete, steel, tile club house and recreation building, incl. fan-shaped swimming pool, 175 ft. on 3 sides and 100 ft. on other, Country Club Dist., $250,000.

N. J., Long Branch — Newton White, c/o Warren & Wetmore, archts., 16 East 47th St., New York, brick club house, Ocean front near Avenel Ave. $250,000. **Maturity after Dec. 1.**

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N. J., Somerville — B. O. P. E., West End Ave., sketches by A. Merchant, archt., 1 Elm Row, New Brunswick, 2 story, basement, brick, steel club. $150,000.

BIDS ASKED

N. J., Hohokus—Owner, c/o P. J. Jossier, archt., 240 Broad Ave., Palisades Park, bids about Nov. 1, general contract 2 story, basement, 90 x 180 ft., brick, stucco golf club. $200,000. Noted Aug. 21.

N. J., Weehawken—W. Mahnken, archt., 401 32nd St., Union City, bids about Nov. 1, general contract revised plans 3 story, basement, brick, steel club house addition, Blvd. E and 6th St., for B.P.O.E., 2 6th St. $150,000. F. J. Ricker, 401 32nd St., Union City, assoc. archt. Noted Sept. 18.

CONTRACTS AWARDED

Calif., Santa Cruz—Santa Cruz Development Co., Scott Valley Hy., 1 story, brick club building, to Hamilton & Church, 383 Ocean Ave., $150,000.

Pa., Creson—State of Pennsylvania, c/o F. St. Clair, engr., Harrisburg, general contract 2 story, basement, 30 x 180 ft. and 40 x 80 ft. T shape brick, steel, stone, to Berkebile Bros., Swank Bldg., Johnstown; plumbing and heating, to H. Daugherty, Freeport; electric wiring, to F. P. Edwards, Bloomburg. Est. $300,000. Noted July 24.

HOSPITALS

PROPOSED WORK

Conn., Bridgeport—Bridgeport Hospital, Grant St., plans by E. B. Caldwell, 886 Main St., 3 story children's ward addition, 3 story maternity ward addition, dining room, all brick. $500,000. Noted May 22.

Ill., Chicago—St. Lukes Hospital, 1439 South Michigan Ave., sketches by Schmidt, Garden & Ericksen, 104 South Michigan Ave., 18 story, nurses home on 125 x 270 ft. site, 1452 Indiana Ave. $3,000,000.

Ky., Louisville—Norton Memorial Infirmary, J. D. Burge, chn., 3rd and Oak Sts., plans by D. X. Murphey & Bros., Louisville Trust Bldg., 5 story, basement, 180 x 330 ft., Y-shaped, steel, brick addition, 3rd and Oak Sts. $500,000.

Mass., Gloucester — Addison Brooks Gilbert Hospital, c/o Phillips & Holloran, archts., 191½ Main St., revised plans altering and constructing 2 and 3 story, basement, brick hospital addition, nurses' home and ward building, plain founds., Washington St. $150,000 or more. Noted July 10.

Mass., Springfield—Wesson Memorial Hospital, 140 High St., brick, steel nurses' home, High St. $150,000. Architect not selected.

N. Y., Port Jefferson—Mather Memorial Hospital nurses home. Project in abeyance. $150,000. H. C. Pelton, 415 Lexington Ave., New York, archt. Noted Mar. 13.

Pa., Pittsburgh—Pittsburgh Hospital, D. I. McCahill, chm., Financial Com., Frick Bldg., plans by J. F. McWilliams, 0200 Penn Ave., brick, steel nurses home, Washington Blvd., Frankstown and Shetland Aves. $300,000.

Que., Montreal—Royal Victoria Hospital 6 story, steel, stone addition, Pine Ave. $246,000.

BIDS ASKED

Mass., Malden (br. Boston)—See "Contracts Awarded."

N. J., Lakewood—Lakewood Milk & Rest Cure, Inc., 154 Nassau St., New York, bids about Nov. 1, general contract 2 story, basement hotel, sanitarium. $300,000. H. Ginsberg, 205 East 42nd St., New York, archt. Noted Aug. 14.

N. Y., New York—See "Contracts Awarded."

O., Dayton — Oct. 21, by Good Samaritan Hospital, brick, steel, concrete hospital. Schenck & Williams, Mutual Home Bldg., archts. Noted July 3.

CONTRACTS AWARDED

Ind., Newcastle — Bd. Comrs. Village of Epileptics, general contract brick, steel, stone, to M. Cutshall, Akron. Est. $150,000. Noted Sept. 11.

Mass., Malden (br. Boston)—Malden Impvt. Trust, c/o J. Cushing, 90 Lyme St., 4 story, basement, brick, stone, plain found., Salem St., separate contracts, $150,000. C. F. Springall, 50 Park St., archt.

Mass., Southbridge — Harrington Hospital Corp., C. D. Harrington, pres., 4 story, basement, 45 x 130 ft., brick, stone, steel plain found., to F. X. Laliberte & Son, 59 Beecher St., est. $200,000; heating and plumbing, to G. C. Winter Co., Southbridge, est. exceeds $25,000; electrical work, to Coughlin Electric Co., 30 Exchange St., Worcester, est. $25,000. Noted Sept. 25.

Mass., Tewksbury—Trustees State Infirmary, Commonwealth of Massachusetts, men's hospital, industrial building, brick, steel, to Dacey & Tibbets, 40 Court St., Boston. Est. exceeds $150,000. Noted Sept. 18.

Nev., Panama City — Panama Nevada Consolidated Mining Co., Las Vegas, Calif., hotel, stores, residences, to McKeefrey Co., 463 North Rodeo Dr., Beverly Hills, Calif., $750,000.

N. Y., Amityville—Brunswick Home (1st unit) sanitarium, to Cosgrove Constr. Co., Glendale. Est. $300,000. Noted May 29.

N. Y., New York—Edwin Gould Foundation for Children, 598 Madison Ave., 2 and 3 story, 77 x 119 ft. hospital, to Gillies Campbell Co., 101 Park Ave. Est. $150,000. Noted Sept. 11.

O., Cleveland—Cleveland Clinic Foundation, G. W. Crile, pres., 2050 East 93rd St., 3 story (ultimately 11 story), 120 x 136 ft., brick, steel, Indiana limestone clinic, to Crowell & Little Constr. Co., Hanna Bldg. Est. $400,000. Noted Sept. 25.

Utah, Provo—State Bldg. Comn., Capitol Bldg., Salt Lake City, 4 story men's ward for State Mental Hospital, to Bernston Bros., Salt Lake City, $203,000. Noted Sept. 18.

Va., Richmond — University of Virginia nurses' home, incl. dance hall, recreation quarters, laboratories, class rooms, to Johnson Constr. Co., Norfolk, $190,476. Noted July 3 under "Schools."

CHURCHES

PROPOSED WORK

Mass., Norwood—Lutheran Emanuel Church, E. O. Hedberg, Berwick Rd., church, Gardner and Berwick Rds. $150,000. Architect not selected.

N. J., Athenia—St. Joseph's Roman Catholic Church, L. Szorc, pres., 5 Parker Ave., Passaic, 2 story, basement, brick, steel church, school, plain found., Speer Ave. $150,000. M. L. Waecher, 131 East 47th St., New York, archt.

N. J., Cliffside—St. Johns the Baptist Roman Catholic Church, J. E. Kierman, pastor, 235 Anderson Ave., Fairview, soon lets contract 2 story, basement, brick, steel, Walker St. and Anderson Ave. $150,000. J. W. O'Connor, 162 East 37th St., New York, archt.

N. J., Dunellen—Holy Innocents Episcopal Church, C. A. Conover, in charge, 334 4th St., plans by H. Day, 300 Vail Ave., 2 story, basement, brick, steel, parish hall, plain found. $150,000. Noted Sept. 4.

N. J., Jersey City—St. Ann's Polish Citizens Church, J. Wrzlciano, pastor, 295 St. Pauls Ave., sketches by A. Peter, 207 Market St., Newark, 2 story, basement, brick, steel church addition, St. Pauls and Tonnelle St. $150,000.

N. J., Perth Amboy—St. Michaels Church, c/o G. W. Brooks, archt., 216 Smith St., 2 story, basement, brick, steel, Hull Ave. $150,000.

N. J., South River—Methodist Church plans by A. Merchant, 1 Elm Row, New Brunswick, 1 and 2 story, basement, tower, church, Main and Gordon Sts. $150,000. Noted Oct. 2.

N. J., Woodcliff—Lutheran Church of Our Savior, H. Koeffler, chm., Building Comn., Hamilton Ave. and 1st Pl., 2 story, basement, brick, steel, Hegeman Pl. and Hudson Blvd. $150,000.

N. Y., New York—Metropolitan Temple, 91 7th Ave., church, 7th Ave. and 13th St. $300,000.

Ont., Toronto—Oakwood Presbyterian Church, Oakwood and Earlscourt Aves., plans by A. G. Clark, 18 Toronto St., 1 story, basement, brick, steel, stone, Holland Park Rd. $150,000.

BIDS ASKED

N. Y., Brooklyn—Oct. 20, by Grace Church, G. Hewlett, secy., 97 Columbia Heights, parish house, rectory, Grace Court and Hicks St. $150,000. F. H. Hutton, 101 Park Ave., New York, archt. Noted Sept. 25.

CONTRACTS AWARDED

Calif., Los Angeles—First Congregational Church, rein.-con., steel, 6th and Commonwealth Sts., to Richards-Neustadt Constr. Co., Garland Bldg., $650,000.

Mass., Lawrence—Holy Rosary Roman Catholic Church, M. Melenese, 35 Essex St., pastor, altering and reconstructing 1 story, basement, brick, stone, concrete, steel, plain found., to M. W. Ryan, 753 Mass. Ave., Cambridge. Est. $150,000.

Pa., Grove City—Grove City College, general contract 2 story, basement, 81 x 160 ft., steel, stone, rein.-con., to R. B. McDanel, New Brighton; heating and plumbing, to H. E. Ash & Co., Grove City; electric wiring, to Ouchiltree Electric Co., 506 Liberty Ave., Pittsburgh. Est. $150,000. Noted June 26.

SCHOOLS

PROPOSED WORK

Calif., Altadena — Pasadena Bd. Educ. plans by Marsten & Maybury, 25 South Euclid Ave., Junior High School, incl. auditorium, library. $250,000.

Calif., Pasadena — California Institute of Technology sketches by Mayers, Murray and Phillips, 2 West 47th St., New York, rein.-con. auditorium. To exceed $150,000.

Ind., Fort Wayne—School Comrs. soon takes bids brick, steel school. $150,000. C. Carlson, 1225 Clinton St., Ft. Wayne, engr.

Ind., Oakland City—Bd. School Comrs. plans by H. E. Boyle & Co., 405 Furniture Bldg., Evansville, brick, steel, stone high school, incl. gymnasium, auditorium, library. $150,000. Noted Apr. 3.

Me., Lewiston—Bates College, H. W. Howe, plans by Miller & Beal Inc., 465 Congress St., Portland, 4 and 5 story, basement, 55 x 150 ft., brick dormitory, plain found. $150,000.

Schools (Continued)

Mass., Attleboro—City, L. A. Fales, supt. Schools. Sanford St., Junior High School, brick, East Side Sect. To exceed $150,000. Architect not selected.

Mass., Fairhaven — Town, W. B. Gardiner, plans by W. Tallman, 222 Union St., New Bedford, and takes bids latter part month. 2 story, basement, brick, steel high school addition, Larch Ave. $200,000. Noted Aug. 15.

Mass., Jamaica Plain (sta. Boston)—City of Boston, Dpt. School Buildings, revised plans by McLaughlin & Burr, 88 Tremont St., Boston, and soon takes bids Intermediate School, 3 story, basement, brick, limestone, plain found., Pershing Rd. and Center St. $600,000. Noted Mar. 27.

Mass., Lawrence—City, Supt. Schools, plans school, Pleasant and Woodlawn Sts. $150,000 or more. Architect not selected.

Mass., Waltham—City, Building Comn., City Hall, receiving competitive sketches Senior High School, 3 story, basement, brick, steel, Bacon and Dale Sts. $1,000,000. Architect not selected.

Mass., West Boylston—Town, Bd. Selectmen, revised plans by Towner & Sellew, 363 Main St., Middletown, Conn., Junior and Senior High School and Municipal Building, 2 story, basement, brick, stone, plain found., Traveled Way. To exceed $150,000. Former bids rejected. Noted Dec. 5.

Mass., Worcester—City, Pub. Building Dpt., trade school annex, Grove St. $125,000-$150,000. Architect not selected.

Mo., Kansas City—Bd. Educ., plans by C. A. Smith, 800 Finance Bldg., auditorium addition, gymnasium and school addition, Kentucky and Home Sts., $710,000; also addition, gymnasium, auditorium, 20th St. and Van Brunt Blvd. $400,000.

N. J., Elizabeth—Bd. Educ., 417 South Broad St., sketches by H. B. Brady, Inc., 333 North Broad St., 3 story, brick, steel addition to Junior High School, plain found., Loomis St. $150,000.

N. J., Elizabeth—Bd. Educ., 417 South Broad St., sketches by H. B. Brady, Inc., 333 North Broad St., 2 story, basement, brick, steel, plain found., South St. $200,000.

N. J., Jersey City—Sacred Heart School, J. Ripple, pastor, Bayview and Jackson Aves., plans by Guilbert & Betelle, 20 Branford Pl., Newark, 2 story addition, Bayview Ave. $150,000. Noted June 19.

N. J., New Milford—Bd. Educ. 2 story, basement, brick, steel addition to Steuben School, River Rd. $150,000. Architect not selected.

N. J., Perth Amboy—Bd. Educ., 261 State St., altering and constructing 3 story, basement, brick, steel addition, Madison Ave. $150,000. Project in abeyance. Noted Aug. 14.

N. J., Port Colden—Bd. Educ., Washington Twp., plans by Jacoby & Everett, Commonwealth Bldg., Asbury Park, Central School, 1 story, basement, brick, steel. $150,000. Noted Oct. 2.

N. J., Sea Bright—Bd. Educ., Sea Bright, sketches by H. B. Seymour, 512 McClellan Ave., Long Branch, altering and constructing 2 story, basement, brick, steel addition, plain found., River St. $150,000.

N. J., Wyckoff — Bd. Educ., School Bldg., plans by Tooker & Marsh, 101 Park Ave., New York, 2 story, basement, brick, steel, Grand View Ave. $150,000. **Maturity indefinite.**

N. C., High Point—Bd. Educ., T. W. Andrews, supt., plans by H. Barton, Jefferson Bldg., Greensboro, Junior High School.

O., Delaware—Bd. Educ., F. C. Bergon, clk., sketches by T. D. McLaughlin & Associates, 610 Savings Bank Bldg., Lima, 3 story, brick, steel, concrete high school. $350,000.

O., Wickliffe—Bd. Educ., M. Beebe, clk., plans by Fulton & Taylor, 8120 Euclid Ave., Cleveland, 3 story, basement, brick, steel, concrete high school. Election Nov. 4. $295,000 bonds for same.

Okla., Tulsa—Bd. Educ., sketches by Smith & Senter, 307 Philtower Bldg., high school, $250,000.

Pa., Pittsburgh—Bd. Educ., H. W. Cramblet, secy., Administration Bldg., sketches by Link, Webster & Bowers, 407 North Craig St., Lincoln Pl. Elementary School, Lincoln Ave. near McAdams St. $200,000.

Pa., Grove City—Grove City College, H. Pew, chn., soon takes bids 2 story, basement, reinforced, dormitory, plain found. $200,000. W. G. Eckles, New Castle, archt. and engr.

Pa., Pittsburgh—Bd. Educ., H. W. Cramblet, secy., Administration Bldg., plans by G. M. Rowland, Bakewell Bldg., Larimer Elementary School, Larimer Ave. $150,000.

R. I., Newport — City, H. W. Lull, supt. schools, revised plans by D. Shapiro, Globe Bldg., Fall River, Mass., and takes bids about Oct. 10, Junior High School, 2 story, brick, plain found., Thayer St. $150,000 or more. Noted July 10.

Tenn., Cookeville—State of Tennessee, Capitol Bldg., Nashville, plans by W. R. Hunt & Co., James Bldg., Chattanooga, Industrial Arts and Home Economics Building for Tennessee Polytechnic Institute. $200,000.

Tex., Ozona — Bd. Educ. plans by Peters, Strange & Bradshaw, Myrick Bldg., Lubbock, and takes bids after Oct. 20, 2 story, brick, reinforced, incl. auditorium, plain found. $150,000.

Tex., Laredo—Bd. Educ., 2 to 3 story, brick, reinforced, high school, $300,000; Junior High School, 2 story, brick, reinforced, plain found., $150,000. Plans bond election Jan. 1 for both schools.

BIDS ASKED

Ind., Gary—Oct. 28, by School Comrs., 3 story, basement, 187 x 295 ft., reinforced, brick, stone, incl. gymnasium, laboratories, boiler room, 45th and Jackson Sts. $1,000,000. W. B. Ittner, 911 Locust St., St. Louis, Mo., archts.

Ind., Harrisburg—Bd. School Comrs. taking bids reinforced, brick, steel, stone, hollow tile consolidated grade and high school. $150,000. Henkel & Hanson, Connersville, archts. Noted Aug. 14.

N. J., New Brunswick—Bd. Educ., Livingston Ave., bids about Dec. 1, 2 story, basement, brick, steel addition to Senior High School, Livingston Ave. $150,000. A. Merchant, 1 Elm Row, archt. Noted July 24.

Del., Newark—Delaware School Found., A. J. Taylor, vice-pres., Du Pont Bldg., bids about Oct. 15, 2 story, basement, brick, steel addition, plain found. $150,000. Guilbert & Betelle, 20 Branford Pl., Newark, N. J., archts. Noted Oct. 2.

Me., Lewiston—Oct. 15, by City, A. Bickford, supt. schools, and Coombs & Harriman, archts., 11 Lisbon St., 3 story, basement, 135 x 280 ft., brick, stone, granite, steel high school, plain found., Central and Campus Aves. $300,000. Noted Sept. 4.

Md., Baltimore—Oct. 22, by Bd. Awards, altering and constructing 3 story, brick, concrete school addition, St. Paul and 26th Sts., B. Evander, 20 East Lexington St., archt. H. G. Perring, Court Sq. Bldg., engr.

Mass., Billerica—Oct. 10, by Town, M. A. Buck, chn. Building Comn., 3 story, basement, 165 x 175 ft., brick, stone school, plain found., Pinehurst Dist. $180,000. P. F. Gilbert, 53 Central St., Lowell, archt. Noted Sept. 25.

Mass., Holyoke—Oct. 15, by City, Bd. P. Wks., City Hall, 3 story, basement, 150 x 235 ft., brick, steel vocational school, plain found., Beech St. To exceed $150,000. G. P. B. Alderman Co., 316 High St., archts. Noted June 26.

Mass., Lawrence—City, M. A. Landers, mayor, City Hall, school, probably brick, stone, Pleasant and Woodland Sts. $150,000-$175,000. Architect not selected.

Mich., Detroit—Oct. 15, by C. A. Gadd, bus. mgr. Bd. Educ., 2 story, basement, brick, reinforced, steel intermediate school, plain found., Philip St., for Bd. Educ., 1354 Broadway Ave. $250,000. B. C. Wetzel & Co., 2317 Dime Bank Bldg., archts.

N. J., Fort Lee—Oct. 20, by Bd. Educ., J. F. Whittaker, pres., High School, Lemoine Ave., 2 story, basement, brick, steel, reinforced, addition, plain found., Palisade Ave. $150,000, Hacker & Hacker, 201 Main St., archt. Noted July 31.

N. J., Summit—Oct. 21, by Bd. Educ., 272 Morris Ave., general contract 2 story, brick, steel, reinforced, school. $150,000. Guilbert & Betelle, 20 Branford Pl., Newark, archts. Noted Sept. 25.

N. J., Summit—Oct. 21, by Bd. Educ., 272 Morris Ave., 2 story, basement, brick, steel addition to Franklin School, Blackburn Rd. $150,000. Guilbert & Betelle, 20 Branford Pl., Newark, archts. Noted Sept. 18.

Ont., Toronto—Bd. Educ., 155 College St., bids about Oct. 3, Earl Beatty School, 3 story, concrete, brick, steel. $175,000. C. E. Dyson, 155 College St., archt.

CONTRACTS AWARDED

Calif., Pasadena — California Institute of Technology, 2 story, 56 x 128 ft., reinforced, astro-physical laboratory, to W. C. Crowell, 495 South Bway., Los Angeles. Est. $800,000. Noted Sept. 4.

Conn., Middle Haddam—Town, Bd. Educ., 2 story, basement, brick, to T. Sellew, Cromwell. Est. $150,000. Noted Aug. 7.

Conn., West Haven (br. New Haven)—City, E. J. Grimes, 2 story, basement, 16 room, brick, steel, West Main St., to F. P. Sullivan, 123 Prospect Rd., East Haven, $130,000 plus. Noted July 24.

Ill., Chicago Heights—General contract Bloom Twp. High School, 2 and 3 story, 6 story tower, U shaped, on 13 acre site, 10th St. and Chicago Rd., to Michuda Bros., Carmen Ave. and Christian St., Chicago; plumbing and heating, to W. F. Hildeman, Chicago Heights; electrical work, to R. V. Carrier Co., Chicago Heights. Est. $350,000.

Ill., Cicero—Bd. Educ., general contract 2 story elementary school on 5 acre tract West 35th and 36th Sts., 61st Ave. and South 60th Court, to F. J. Neidl & Sons, Cicero. Est. $350,000.

Ind., Bloomington — School Comrs., brick, steel, 2nd St., to Mustard-Curry Co., 5th St. and Monon Ry. Est. $150,000. Noted Sept. 4.

Mass., Cambridge—Harvard University, 3½ story, basement, brick, limestone, granite dormitory, master's house known as "Kirkland House," plain found., to J. Slotnick, 199 Washington St., Boston. Est. exceeds $150,000. Noted Sept. 11.

Mass., Dedham—Noble & Greenough School, Bridge St., stone, infirmary, Bridge St., to F. A. Smith, West Main St., Medfield. Est. $150,000.

Mass., Newton—Boston College, J. M. Kilroy, 140 Commonwealth Ave., altering and constructing 4 story, basement, 90 x 102 ft. and 1 story, basement, 50 x 130 ft., stone, private college addition known as St. Mary's Hall, plans found., to Charles Logue Building Co., 18 Tremont St., Boston. Est. exceeds $150,000. Noted Oct. 2.

Mass., Wellesley — Wellesley College, E. F. Pendleton, pres., 3 story, basement, brick, zoological laboratory, plain found., to L. D. Wilcutt & Sons Co., 146 Summer St., Boston. Est. $250,000. Noted Sept. 18.

Mass., Worcester — Commonwealth of Massachusetts, Dpt. Educ., State House, Boston, State Normal School, 3 story, basement, brick, steel, plain found., to J. P. Keating Co., 80 Boylston St., Boston, $238,000. Noted Sept. 18.

Minn., Minneapolis—Swedish Tabernacle, 625 8th St., South Minneapolis, foundation and basement for 3 story, basement, 62 x 111 ft., reinforced, brick school, to Field-Martin Co., 720 South 6th St. Est. $150,000. Noted Aug. 28.

N. Y., Newark Valley—Bd. Educ., 2 story school, to W. Lyon & Son, Herkimer, $217,300; plumbing, to R. Lewis, Cortland, $16,300; heating, to F. Bradt Co., 113 Oakwood Ave., Syracuse, $37,480. Grand total $271,080.

Okla., Oklahoma City—J. G. Stearley, clk. Bd. Educ., William Howard Taft High School, 2 story, basement, 202 x 250 ft., reinforced brick, plain found., to Mann Constr. Co., Petroleum Bldg., $209,866. Noted Sept. 25.

Okla., Oklahoma City—J. G. Stearley, clk. School Bd., Stonewall Jackson Junior High School, 2 story, basement, 240 x 252 ft., reinforced, brick, to C. M. Dunning, 420 North Hudson St., $171,750. Noted Sept. 18.

Pa., Grove City—W. G. Eckles & Co., archts., Law Savings & Trade Bldg., New Castle, 2 story, 100 x 300 ft., brick, hollow tile, steel science building, to R. E. McDanel Co., New Brighton; plumbing and heating, to F. P. Andrews & Son, New Castle; electric wiring, to Ochiltree Electric Co., 505 Liberty Ave., Pittsburgh. Est. $300,000. Noted Sept. 18.

THEATRES

PROPOSED WORK

O., Mansfield—Warner Bros. Theatres, Inc., 321 West 44th St., New York, 2,500 seating capacity theatre, mercantile building, downtown district. $450,000. Architect not selected.

Pa., Turtle Creek—Imperial Chain Theatres, Inc., J. L. Selznick, pres., Clark Bldg., Pittsburgh, plans by Marks & Kann., Home Trust Bldg., Pittsburgh, white brick, steel, terra cotta theatre.

BANKS

PROPOSED WORK

Mass., Foxboro—Foxboro Natl. Bank, E. H. Bristol, pres., 2 School St., plans by Hutchins & French, 11 Beacon St., Boston, 1 story, basement, irregular sized, brick limestone, concrete steel, plain found., Cocasset St. $150,000.

N. Y., New York — Bankers Trust Co., 16 Wall St., plans by C. E. Birge, 29 West 34th St., bank addition, 16 Wall St. To exceed $2,000,000. **Maturity indefinite.**

BIDS ASKED

N. J., Union City—Oct. 7, by Crow, Lewis & Wick, archts., 200 5th Ave., New York, altering and constructing 2 story, basement, brick, steel addition to bank and office, Bergenline Ave. and 48th St. for Weehawken Trust & Title Co., 980 Bergenline Ave. $150,000.

CONTRACTS AWARDED

Wis., Milwaukee—Home Savings Bank, 764 3rd St., excavating and concrete work for 5 story, basement, 50 x 150 ft., brick, steel, incl. offices, 3rd St., to W. Gehring, 1890 12th St., structural steel, to Worden-Allen Co., Pt. Washington Rd. Est. $235,000.

LOFTS

CONTRACTS AWARDED

N. J., Jersey City—B. and M. W. Holding Co., S. Leider, pres., 905 Linden Blvd., Brooklyn, N. Y., general contract 2 story, basement, brick, steel, loft, stores, 75-85 Monticello Ave., to S. Leeder, 905 Linden Blvd., Brooklyn, N. Y. Est. $150,000.

N. Y., New York—Three Hundred Eighteen East 47th Street, N. Pickett, 271 Madison Ave., loft, showrooms, 318 East 47th St., to Magoba Constr. Co., 271 Madison Ave. Est. $500,000. Contractor taking bids on separate contracts. Crossfield Furniture Co., lessee.

OFFICES

PROPOSED WORK

Calif., Los Angeles—Western National Co., 6th and Olive Sts., plans by R. Falkenwrath, Chamber of Commerce Bldg., 13 story, basement, 132 x 150 ft., steel, reinforced, 6th and Olive Sts. $2,000,000.

Mich., Detroit—New Center Development Co. (Fisher Bros.), Fisher Bldg., plans by Albert Kahn, Inc., 1000 Marquette Bldg., 10 story,

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Offices (Continued)

basement, 105 x 106 x 285 ft., brick, stone, concrete, steel office, caisson found., to be connected with Fisher Bldg. by underground tunnel.

N. M., Albuquerque — Owner, c/o Trost & Trost, archts., Two-Republics Bldg., El Paso, Tex., preliminary surveys 10 story, basement, office, hotel. $400,000.

N. J., East Orange—Baldwin Constr. Co., 614 Central Ave., will not build office, stores, 578 Central Ave. $150,000. Project abandoned. Warren & Warren, 31 Clinton St., Newark, probable archts. Noted Aug. 28.

N. J., Hackensack—Owner, c/o P. J. Jossier, archt., 240 Broad Ave., Palisades Park, bids about Dec. 1, 2 story, basement, 60 x 120 ft., brick, steel office, stores, showroom, Main St. $150,000. Noted Sept. 4.

O., Columbus — Amer. Educational Press, Inc., H. M. Sayre, pres., 40 South 3rd St., plans by Richards, McCarthy & Bulford, 555 East Broad St., 8 story, basement, 64 x 100 ft. office, 40 South 3rd St. $300,000.

Ont., Toronto—Yolles & Rotenberg, 372 Bay St., 20 story, 3 story basement, rein.-con. stone, brick office, $600,000. Work will probably be done by day labor. Chapman & Oxley, Sterling Tower, archts. Noted Jan. 23.

BIDS ASKED

Mass., Everett—Merrimac Chemical Co., Inc., Everett, taking bids 2 story, basement, 75 x 160 ft., brick, limestone, rein.-con., steel, concrete found., Chemical Lane. $150,000. Lockwood, Greene & Co., 24 Federal St., Boston, archts. and engrs. Noted Sept. 25.

N. J., Matawan—See "Contracts Awarded."

N. J., Montclair — Holmes & Von Schmid, archts., 42 Church St., bids about Oct. 15, general contract 1 story basement, mezzanine, brick, steel, for Town Trust Co., 79 Walnut St. $150,000. Noted Oct. 2.

N. Y., New York—H. I. Feldman, archt., 15 West 44th St., taking bids on separae contracts 2 story, 90 x 175 ft. office, stores, Tremont and Washington Aves., for Glenmont Realty Co., 11 East 42nd St. $150,000. Noted Oct. 2.

O., Dayton—See "Contracts Awarded."

CONTRACTS AWARDED

Mass., Lynn — Equitable Co-Operative Bank, F. W. Hixon, 145 Munroe St., 2 story, basement, brick, concrete, steel, concrete found., to Campbell Bros., 101 Sagamore St. Est. $150,000 or more. Noted Sept. 18.

N. J., Matawan—F. Burlew, E. Currie & J. Tassini, 2 story, basement, brick, steel office, store, Main St. near Little St., separate contracts. $150,000. Private plans.

O., Dayton—Schenck & Williams, archts., 3rd Natl. Bldg., 20 story, stone, steel, rein.-con., incl. bank, West 2nd St., separate contracts, for Mutual Home and Building Assn., 2nd and Main Sts. Total est. $1,000,000. Structural steel, to Dayton Structural Steel Co., 1615 Springfield, $124,000; erecting steel, to John G. Poole Co., Ludlow Arcade Bldg., $36,000; excavation, to G. H. Shartzer Co., North Irwin St., $30,000; foundation, to A. V. Kimmell, 480 Huffman Ave., $21,000.

Pa., Pittsburgh—A. W. and R. B. Mellon, 514 Smithfield St., 5 story, basement, 160 x 160 ft., brick, stone medical arts building, incl. garage, to D. T. Riffle, 1006 Forbes St. Est. $600,000. Noted Aug. 14.

Wash., Seattle — Textile Towers, Inc., 17 story, basement, sub-basement, 120 x 132 ft., brick, steel, terra cotta, rein.-con. office, stores, 7th and Olive Sts., to Henrikson-Alstrom Co., Securities Bldg., Seattle. $1,250,000.

STORES

PROPOSED WORK

Calif., Los Angeles—Owl Drug Co., 551 South Bway., plans by E. Bergstrom, City Natl. Bank Bldg., 6 story, basement, rein.-con. store, incl. lofts, 8th and Flower Sts. Est. exceeds $150,000.

Calif., Los Angeles—Walker & Eisen, archts., Western Pacific Bldg., soon take bids 2 story, basement, 175 x 175 ft., concrete, brick, Wilshire Blvd., for Westmoreland Building Co., Wilshire Blvd. $200,000.

Calif., Sacramento—S. H. Kress Co., 621 South Bway., Los Angeles, plans by Architectural Division of Owner, 3 or 4 story, 60 x 160 ft., 818 K St. $300,000.

N. J., East Orange—Dablyn Realty Corp., H. Jaffe, pres., 44 Court St., Brooklyn, N. Y., plans by W. J. Fitzsimmonds, 626 Central Ave., 2 story, basement, 100 x 175 ft., brick, steel stores, restaurant, bowling alleys, 650 Central Ave. $150,000. Noted Oct. 2.

N. Y., Brooklyn—Kings Rugby Corp., A. Halperin, pres., 26 Court St., plans by Cohn Bros., 361 Stone Ave., stores, apartments, East 51st and Clarkson Sts. $150,000.

N. Y., New York—Owner, c/o Siegel & Levy, archts., 1775 Bway., sketches 2 story department store, Jerome Ave. and 170th St. To exceed $150,000. H. S. Helfer Department Store, Burnside and Walton Aves., lessee.

N. Y., New York—H. Mandel, 10 East 40th St., stores, apartments, swimming pool, 57th St. between 8th and 9th Aves. To exceed $2,500,000.

N. Y., White Plains — H. M. Palmer, 152 West 42nd St., New York, 50 x 140 ft. store, office, 178 Mamaroneck Rd. $150,000.

R. I., Pawtucket—C. H. Bachand, 33 Montgomery St., altering and consfructing stores, offices, hotel addition. $150,000 or more. Architect not selected.

BIDS ASKED

N. J., Jersey City—A. Cordano, c/o M. A. Wolf, archt., 845 Broad St., Newark, bids about Nov. 1, general contract 3 story, basement, brick, steel store, apartment, Manhattan and Terrace Aves. $150,000. Noted Sept. 11.

N. Y., Brooklyn—See "Contracts Awarded."

CONTRACTS AWARDED

Ind., Ft. Wayne—Boston Store, 604 Calhoun St., general contract 3 story, basement, 75 x 150 ft., brick, steel, terra cotta furniture store, to W. A. Sheets Constr. Co., 334 Utility Bldg. Est. $150,000. Noted Sept. 25.

N. J., East Orange—B. Altman & Co., 34th St. and 5th Ave., New York, general contract 4 story, basement, brick, steel, Central Ave. between Evergreen Pl. and Harrison St., to Hegeman-Harris Co., 360 Madison Ave., New York. Est. $150,000 or more. Excavation in progress.

N. Y., Brooklyn—Cranlyn Building Corp., R. H. Johnston, pres., 205 East 42nd St., New York, 100 x 112 ft. stores, apartments, Cranberry and Henry Sts., separate contracts. $750,000.

N. Y., New York—C. R. Lee, stores, office, 2309 Bway., to G. N. Weinstein, 151 West 40th St. Est. $150,00. Contractor taking bids on separate contracts.

O., Cleveland—Benjamin Rose Estate, P. A. Frye, mgr., Rose Bldg., altering 4 store rooms into cafeteria, steel, tile, marble, concrete, to Masters & Mullen Constr. Co., Rose Bldg. Est. $300,000. Forum Cafeterias Co. of America, 1220 Grand St., Kansas City, Mo., lessee. Noted Oct. 2.

R. I., Newport—Newport Realty Corp., 281 Thames St., 4 story, basement, brick, stone, incl. offices, plain found., Washington Sq. and Colonial St., to J. R. and J. A. Whelan, 907 South 47th St., Phila., Pa. Est. $150,000.

PUBLIC

PROPOSED WORK

Conn., Mystic—ADMINISTRATION—Mystic Oral School plans by Payne & Keefe, 231 State St., New London, brick, steel administration building. $200,000. Noted Oct. 2.

Mass., Northampton—POLICE BARRACKS—Commonwealth of Massachusetts, State Police Div., state police barracks at Laurel Park Junction. $150,000 or more. Architect not selected.

N. J., Elizabeth—COURT HOUSE—Bd. Freeholders Union Co., Court Housg, sketches by Oakley & Son, 1259 Clinton Pl., addition, Broad and Rahway Sts. $500,000.

N. J., Irvington (br. Newark)—FIRE HOUSE—Bd. Town Council, Town Hall, 1253 Clinton Ave., plans by G. F. Lederer, 2 Union Ave., 2 story, basement, brick, steel, Grove St. and 18th Ave. $150,000.

N. Y., Dannemora—DORMITORY—Dpt. Correction, State Office Bldg., Albany, bids in October, employees building (dormitory) at Dannemora State Hospital.

N. Y., Rockaway—COURT HOUSE—G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., Long Island City, bids latter part month, general contract 2 and 3 story, 87 x 190 ft. court house, Beach Dr. and 90th St. $375,000. P. C. Hunter, 191 9th Ave., New York, archt.

Okla., Chickasha—COURT HOUSE—Grady Co. sketches by E. H. Eads & Co., Hall Busior Bldg., court house. $250,000.

Tex., Cotulla—COURT HOUSE and JAIL—La Salle Co. plans by H. Phelps, Hicks Bldg., San Antonio, 4 story, basement, brick, rein.-con. plain found. Election Oct. 15. $150,000 for same. Noted Oct. 2.

B. C., Victoria — COURTHOUSE — Provincial government plans by H. Whittaker, Dpt. Pub. Wks., rein.-con., brick, steel. $1,000,000. P. Philip, c/o Dpt. P. Wks., engr.

Ont., Toronto — MUSEUM — Royal Ontario Museum, Bloor St. W., soon takes bids 3 story, basement, steel, brick addition, concrete found. $1,500,000. Chapman & Oxley, Sterling Tower, archts. Noted Apr. 17.

BIDS ASKED

Mich., Ypsilanti—DORMITORY, etc.—Oct. 14, by G. R. Thompson, budget dir., Lansing, 2 and 3 story, brick steel, concrete, stone dormitory and apartment, staff apartment and superintendent's residence for State of Michigan, Administrative Bd., Lansing. $350,000. A. Kahn, 1000 Marquette Bldg., Detroit, archt.

N. J., Bayonne—FIREHOUSES—Bd. City Comrs., City Hall, bids probably about Nov. 1, 2 story, basement, brick, steel, firehouses. $150,000. I. Quien, 229 Broad St., Elizabeth, archt. Plumbing, heating, ventilating, boilers, metal lath, etc.

N. J., Irvington (br. Newark) — POLICE HEADQUARTERS — Bd. Town Council, Township Hall, bids about Nov. 15, 2 story, basement, brick, steel addition, Washington Ave. $150,000. G. F. Lederer, 2 Union Ave., archt. Noted Oct. 2.

N. Y., White Plains—COUNTY CENTER—Oct. 22, at office Westchester Co. Park Comn., 72 West Pondfield Rd., Bronxville, additional construction for Westchester Co. Center Building, J. Downer, Bronxville, ch. engr.; adv. E. N.-R. Oct. 9.

CONTRACTS AWARDED

Calif., Los Angeles—OFFICE—G. B. Dougall, P. Wks. Bldg., City Hall, general contract 12 story, 88 x 168 ft., rein.-con., granite terra cotta, marble, tile, steel, Civic Center, to Weymouth Cromwell Co., 2104 East 15th St., $639,000; granite, to McGilvray-Raymond Co., 678 South Anderson St., $199,385; steel and elevators, to Consolidated Steel Corp., 1200 North Main St., $128,775 and $47,900 respectively; electrical work, to Walker Electric Co., $48,894; plumbing, to Pacific Pipe & Supply Co., 1002 Santa Fe St., $47,672; heating, to Lehman Bros., 232 South Spring St., $33,383; ventilating, to J. Herman Co., 1349 East Vermont St. $16,850. Grand total $1,161,895. Noted Sept. 11.

Mass., Springfield—LIBRARY—City, Library Assn., H. C. Wellman, 2 story, brick branch library, plain found., Liberty St., to W. W. Davis, 97 Bellevue Ave. Est. $150,000.

Mass., Waltham — FIRE STATION — City, P. J. Duane, mayor, 2 story, basement, brick, concrete, steel, concrete found., to J. B. Dolan, 43 Tremont St., Boston. Est. $150,000. Noted July 31.

Mass., Woburn—CITY HALL, etc.—City, P. J. Gallagher, mayor, 2 story, basement, brick, stone, 2 story, basement, brick, stone city hall, police station and court house, plain found., to P. J. Cantwell, 6 Dakota St., Dorchester. Est. $250,000. Noted Sept. 11.

BUILDINGS—UNCLASSIFIED

PROPOSED WORK

Calif., Los Angeles—PLANETARIUM—Gift of the Late G. J. Griffith, Security—First National Bank, 5,000 seating capacity large domed building in connection with science hall, astronomical observatory, Mt. Hollywood. $350,000.

Conn., Bristol—EXCHANGE—Southern New England Telephone Co., 157 Church St., plans by D. Orr, 956 Chapel St., New Haven, and soon takes bids 2 story, basement, 85 x 115 ft., brick, stone, steel, plain found. $150,000. Noted Sept. 11.

Mass., Boston—RAPID TRANSIT STATION—Commonwealth of Massachusetts, Dpt. P. Utilities, E. Springer, ch. engr., 1 Beacon St., sketches rapid transit station at Cambridge and Charles Sts., Cambridge subway. $375,000.

N. J., Jersey City—HOME—Hebrew Home for Aged, M. Z. Hurwitz, chn., 161 Summit Ave., 2 story, basement, brick, steel home for aged. $150,000. Project in abeyance. Noted Mar. 13.

N. J., Newark—MARKET—Steuben Holding Corp., 60 Park Pl., plans by F. H. Koenigsberger, 48 Walnut St., 2 story, basement, brick, steel, Washington and Linden Sts. $150,000. Noted Oct. 2.

N. J., Spring Lake — PAVILION, etc. — Bd. Boro Comn., Boro Hall, plans by E. H. Schmeider, 3rd Ave., 2 story, towers pavilion, bath houses, swimming pool. $160,000.

N. H., Manchester — ORPHANAGE — Notre Dame Hospital, A. Goulin, in charge, sketches by W. E. Provost, 1061 Elm St., orphanage. $150,000 or more.

N. Y., New York—EXCHANGE—New York Telephone Co., 140 West St., exchange, Beekman, Spruce and William Sts. To exceed $1,000,000. **Maturity indefinite.**

N. Y., New York — RESTAURANT — Childs Co., 200 5th Ave., restaurant, kitchen, offices, 136 William St., $150,000.

O., Mansfield—REPEATER STATION—Ohio Bell Telephone Co., 750 Huron Rd., Cleveland, repeater station and exchange building, West 2nd St. $335,000.

O., Youngstown — CHAPEL — Forest Lawn Memorial Cemetery plans by Dunn & Copper, 4500 Euclid Ave., Cleveland, 1 and 2 story, stone, steel, concrete chapel and administration building. $150,000.

Okla., Tulsa — FAIR — Tulsa Co., J. J. Kramer, secy., preliminary plans additional fair buildings. $200,000. C. K. McClelland, Tulsa, engr.

Tex., Beaumont—COMMERCIAL—Owner, c/o Babin & Neff, archts., 417 Perlstein Bldg., sketches 14 story, basement, fireproof. $500,000.

Tex., Beaumont—MEDICAL ARTS—W. C. Keith, Keith Bldg., sketches by F. C. Stone, 120 Goodhue Bldg., 14 story, basement, brick, rein.-con., steel, 60,000 sq.ft. floor space, plain found. $500,000.

BIDS ASKED

Calif., Los Angeles — NEWSPAPER — I. C. Copley & Southern California Newspaper Assn., 510 South Spring St., taking bids 5 story, 115 x 127 ft., rein.-con., steel, stucco, stone, hollow tile, marble, 1545 North Wilcox Ave. $170,000. F. D. Rutherford, 205 Mills-Fraser Bldg., Santa Monica, archts.

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Buildings Unclassified (Continued)

Md., Baltimore—HOME—Oct. 11, by O. E. Adams, archt., 331 North Charles St., brick, steel, rein.-con. home for aged, Mt. Washington St., for Home for Aged of Methodist Episcopal Church, c/o architect. $200,000.

N. J., Keyport—EXCHANGE—New Jersey Bell Telephone Co., 50 Broad St., Newark, bids about Oct. 15, general contract 2 story, basement, brick, steel. $150,000. H. B. Brady, Inc., 333 North Broad St., Newark, archt. Noted Sept. 18.

CONTRACTS AWARDED

Calif., Oakland—DISPLAY and STORAGE—E. R. Bacon Co., 17th and Fulton Sts., San Francisco, designing, constructing 1 story, 100 x 120 ft., steel, to Austin Co., 16112 Euclid Ave., Cleveland, O., $300,000. Contractors Machinery Exchange, 1135 57th St., lessee.

N. J., Newark — ART GALLERY and MUSEUM—J. H. and W. C. Ely, archts., 605 Broad St., general contract 3 story, basement, 118 x 120 ft., brick, steel art gallery and museum, to E. M. Waldron, Inc., 40 Park Pl., for New Jersey Historical Society, 16 West Park St. $350,000. Noted Sept. 18.

N. Y., Pelham Manor—COMMUNITY HOUSE—Huguenot Memorial Church, 2 story, basement, 115 x 140 ft., brick, stucco, to W. L. Crow Constr. Co., 101 Park Ave., New York. Est. $200,000. Noted Aug. 7.

Buildings

FACTORIES AND MILLS

PROPOSED WORK

Ark., Texarkana—BAKING PLANT—Butter Nut Bread, c/o A. C. Worthen & O. J. Johnson, Texarkana, concrete, brick baking plant, 10th and State Line Sts.

Calif., Emeryville—FURNITURE FACTORY—Furniture Corp. of America, c/o Doernbecher Mfg. Co., East 28th St., North Portland, Ore., sketches factory. $250,000 or more. Architect not selected.

Calif., Los Angeles — FACTORY — Coopers, Kenosha, Wis., G. Cooper, secy., 750 South Los Angeles St., sketches factory. To exceed $500,000. Architect not selected.

Calif., Oakland—FACTORY—Hammar Bray Co., 26th Ave. and East 12th St., plans by C. N. Burrell, Amer. Bank Bldg., factory, 102nd St. $200,000.

Conn., Danbury — FACTORY — Concannon Shear Co., 2 story, 40 x 150 ft. shear manufacturing plant, brick. $45,000. Private plans.

Conn., Woodbridge—PLANT—Shepard Dairy, c/o L. A. Juliane, archt., 42 Church St., New Haven, pasteurization plant. $40,000.

Ga., Swainsboro—BOTTLING PLANT—Alabama Coco Cola Bottling Co., J. Eros, genl. mgr., Anniston, Ala., plans by Pringle & Smith, Norris Bldg., Atlanta, 1 story, basement, brick, concrete bottling plant. $40,000.

Ia., Sioux City — DAIRY PLANT — Roberts Sanitary Dairy Co., D. E. Roberts, genl. mgr., 809 Douglas St., sketches 2 story, 160 x 175 ft., concrete, brick, West 14th and Omaha Sts. $100,000.

Mass., Pittsfield — TRANSFORMER TANK PLANT—General Electric Co., E. A. Wagner genl. mgr., 1 story, 150 x 600 ft., 30 x 350 ft., steel, glass, concrete, incl. 1,500 tons structural steel, 32,000 panes glass, welded steel pilasters, Tyler St. and Benedict Rd. $1,000,000. Private plans.

N. J., Bound Brook—FACTORY—J. N. Pierson & Son, archts., 198 Jefferson St., Perth Amboy, rejected bids 1 story, basement factory, for Pathe Exchange, Inc., Middlesex Boro. $40,000. Noted Sept. 25.

N. J., Newark — FACTORY — Beacon Upholstering Co., 23 Rankin St., sketches by Siegler & Greenberg, 164 Market St., factory, Belmont and Hawthorne Aves. $75,000.

N. J., Newark—REPAIR—Bd. Educ., City Hall, sketches 3 story, basement, brick, steel repair department building. $150,000. Noted Sept. 4.

N. J., Newark—FACTORY—Weldon Roberts Rubber Co., 18 Oliver St., plans by M. N. Shoemaker, 10 Bleeker St., altering 2 story, basement, brick, steel, rein.-con., plain found., 361-65 6th Ave. $40,000.

N. J., Perth Amboy—DAIRY PLANT—Ballinger Co., archts., 100 East 42nd St., New York, soon lets contracts 1 and 2 story, basement, brick, steel, rein.-con., for Industrial Realty Co., 683 New Brunswick Ave. $40,000 or more. Puritan Dairy Products Co., 683 New Brunswick Ave., lessee. Noted Oct. 2.

N. J., South Amboy — FACTORY — Sun Oil Co., 1608 Walnut St., Phila., Pa., plant, $250,000.

N. Y., Brooklyn—PAINT PLANT—Corporation, c/o H. Holder, archt., 242 Franklin Ave., bids late in November, general contract paint manufacturing plant. Noted Dec. 26.

N. Y., Brooklyn—FACTORY—L. Davidson, archt., 104 West 42nd St., New York, bids in December, general and separate contracts 4 story, 150 x 376 ft., rein.-con., 38th St. and Dahill Rd., for Metwood Holding Corp., 1380 Metropolitan Ave. $550,000. Noted Dec. 5.

N. Y., Brooklyn—FACTORY—See "Contracts Awarded."

N. Y., Brooklyn—FACTORY—F. Savignano, archt., 6005 14th St., bids after Oct. 13, 100 x 100 ft. factory, Gravesend Ave. and Avenue J, for D. Cuozzo, 369 1st St. $40,000. Noted Sept. 25.

N. Y., Brooklyn — BAKERY, etc. — G. F. Stuhmer & Co., E. S. Bryezynski, pres., 570 7th Ave., New York, plans by J. H. Knubel, 570 7th Ave., New York, altering bakery and storage, Park Ave. and Taaffe Pl. $40,000.

N. Y., Brooklyn — BOAT PLANT, etc. — Wheeler Holding Corp., 18th St. and Coney Island Creek, sketches by H. E. Wheeler, 1540 Brooklyn Ave., 120 x 245 ft. metal boat building plant and boat house, West 18th St. and Avenue Z. $45,000.

N. Y., New York—FILM FACTORY—Attica Film Corp., 544 West 43rd St., bids in December, general contract film factory, 548 West 43rd St. $40,000. R. L. Senior, 142 East 43rd St., archt. Noted Jan. 9.

N. Y., Penn Yan — MILK PLANT — A. H. Krauss, Geneva, milk and dairy distributing plant, Seneca St. To exceed $150,000. Sheffield Farms 524 West 57th St., probable lessee.

N. Y., Stapleton (sta. Staten Island) — BREWERY, etc.—Rubsam & Horrman Brewing Co., 191 Canal St., bids about November, brewery, ice manufacturing, storage, $300,000. Architect not selected. Noted Sept. 18.

O., Cleveland—PRINTING PLANT—Reserve Lithographine & Printing Co., P. N. Calvert, pres., Caxton Bldg., plans by W. R. Howell, Rose Bldg., 3 story, basement, 100 x 132 ft., brick, rein.-con., East 9th St. and Wigman Court. $150,000.

Pa., Pittsburgh—BAKING PLANT—Duquesne Baking Co., J. P. Williams, in charge, 223 Auburn St., rebuilding plant, destroyed by fire. $150,000. Architect not selected.

Tex., Temple—REFINERY—Texas & Pacific Coal & Oil Co., gasoline and by-products refinery. $500,000.

W. Va., Wierton.— TIN PLATE PLANT — Wierton Steel Co., J. C. Williams, pres., soon lets contract complete electrification of plant. $250,000.

Ontario—STEEL MILL—Crucible Steel Co., 17 East 42nd St., New York, steel mill, near Toronto or Hamilton. $1,000,000. **Maturity indefinite.**

Ont., Chatham — NEWSPAPER PLANT — Chatham Dairy News, rebuilding 3 story, basement, brick, steel, destroyed by fire. $100,000.

Ont., Cornwall — SILK FACTORY — Courtauld's Canada Ltd., building for manufacturing rayon silk. $500,000. Private plans.

Ont., Toronto—DAIRY PLANT—Highland Dairy Ltd., 666 Ontario St., 2 story, basement, brick, steel addition, concrete found. $50,000. R. B. McGiffin, 24 Bloor St. W., archt.

Que., Montreal—FACTORY—I. L. Vachan Ltd., 5604 St. Hubert St., sash and door factory, St. Hubert St. $60,000.

BIDS ASKED

Calif., Glendora—PACKING PLANT—Glendora Lemon Groves Assn., taking bids 2 story, basement, 90 x 163 ft., rein.-con., stucco, steel, $45,000. W. Wache, 1616 4th Ave., Los Angeles, archt.

Calif., Los Angeles—PLANT—Brunswig Drug Co., 501 North Main St., taking bids (selected list contractors), 5 story, basement, 100 x 150 ft., concrete, brick, 2nd St. between San Pedro St. and Central Ave. To exceed $500,000. Noted Sept. 4.

Conn., New Britain—FACTORY—Vulcan Iron Wks., 63 John St., taking bids (selected list of bidders), 1 story, 70 x 175 ft., brick, steel, $50,000. M. J. Unkelbach, 52 Main St., archt. Noted July 31.

N. J., Newark—FACTORY—P. A. Singer Bros., 113 New Jersey R.R. Ave., taking bids general contract 1 story, basement 40 x 110 ft., brick, steel addition, 170 Delancy St. $40,000. M. A. Wolfe, 845 Broad St., archt. Noted Oct. 2.

N. J., Rutherford—FACTORY—Oct. 15, by S. Cordo, 23 West Erie Ave., general contract 2 story, basement, 50 x 80 ft., brick, steel, addition, plain found., 23 West Erie Ave. $40,000. F. Pierrone, 104 Midland Ave., W. Garfield, archt. Noted Sept. 18.

N. J., Teaneck—LAUNDRY PLANT—C. G. Mettberg, archt., 16 Depot Sq., Englewood, taking bids general contract 1 story, basement, 125 x 150 ft., brick, steel, Front and Water Sts., for Owner, c/o architect. $40,000.

N. J., Union City — DAIRY PLANT — G. Willaredt, archt., 411 23rd St., West New York, taking bids general contract altering and constructing 2 story, basement, 25 x 155 ft., brick, steel addition, plain found., 45th St. and New York Ave., for Consumers Dairy Co., 400 45th St. $45,000.

O., Cleveland — FACTORY — W. H. Hatch, archt., Hippodrome Bldg., taking bids 1 story, 60 x 225 ft., steel, corrugated iron siding, concrete found., Harvard Ave. and Jennings Rd., for Norcross Marble Co., J. W. Young, pres., Harvard Ave. and Jennings Rd. $75,000. Noted Sept. 18.

O., Willard—FACTORY—Oct. 20, by T. W. Beelman, Willard Burial Vault Co., 1 story, along Baltimore and Ohio R.R. tracks. $40,000.

Tex., Luling—See "Contracts Awarded."

Wis., Lake — FACTORY — Wrought Washer Co., F. Duepke, pres., 465 Bay St., Milwaukee, taking bids 65 x 500 ft. rolling mill, 65 x 385 ft. storage house, and 100 x 1,250 ft. shipping department. Klug & Smith, 69 East Wisconsin Ave., archts.

CONTRACTS AWARDED

Ark., Jonesboro—MILL—Jonesboro Rice Milling Co., c/o H. E. Bovay, pres. Dermon Bldg., Memphis, Tenn., 4 story, 42 x 42 ft., rein.-con., corrugated iron, to E. G. Hodges, Cotton Exch. Bldg., Memphis, Tenn. Est. $125,000 incl. machinery.

Calif., Bakersfield — METER SHOP — San Joaquin Light & Power Corp., Power Bldg., Fresno, 1 story, 35 x 80 ft., rein.-con., steel, to C. Grambling, Bakersfield.

Calif., Broderick — RICE MILL — California Rice Growers Assn., E. L. Adams, pres., Chico, steel, concrete mill, to McGillivray Constr. Co., Folsom Blvd. and 65th St., Sacramento. $100,000.

Calif., Glendora—PACKING PLANT—Glendora Lemon Growers Assn., 2 story, basement 90 x 163 ft., rein.-con., stucco, steel, to Mutter Bros., 743 East 61st St. $45,000. Noted Oct. 8.

Calif., San Francisco—COLD STORAGE—H. Moffatt & Co., 3rd St. and Arthur Ave., 2 story, basement, rein.-con., steel, 3rd St. and Arthur Ave., to Barrett & Hilp, 918 Harrison St. $75,000.

Calif., Huntington Park—FACTORY—Baker Tools Co., Inc., 2959 East Slauson Ave., 1 story, 65 x 577 ft., 1st unit will be 68 x 118 ft., concrete, corrugated iron, steel sash, East Slauson Ave., to Brownell Constr. Co., 2528 Slauson Ave. Est. $125,000.

Ill., Chicago—WOOD WORKING PLANT—Ideal School Supply Co., 8316 Birkhoff Ave., 1 story, 60 x 120 ft., brick, steel, 8316 Birkhoff Ave., to Austin Co., 16112 Euclid Ave., Cleveland, O. Est. $50,000.

Ind., Evansville—PLANT and SERVICE STATION—Lincoln Oil Co., F. Fisher mgr., brick, rein.-con., Illinois and Morton Aves. $45,000. Owner builds.

Ind., Evansville—FACTORY—Servel, Inc., 19 Morton St., F. P. Nehrbas, genl. mgr., general contract brick, steel, 30,000 sq.ft. floor space, brick, steel addition, special founds. for heavy machinery, to Hoffman Constr. Co., 403 Furn Bldg. Est. $100,000.

Ind., Indianapolis—UNLOADING PLANT—Supreme Oil & Refining Co., 518 North Delaware No. 402, general contract 1 story, 99 x 102 ft., steel, brick, rein.-con., to J. R. Curry Co., 200 Empire Life Bldg. Est. $45,000. Noted Aug. 21.

Ind., Indianapolis — PLANT — L. Yunckers, 858 Moss Ave., general contract rein.-con., brick bottling works, to W. P. Jungelaus, 825 Moss Ave. Est. $50,000.

Mass., Boston—MANUFACTURING—R. C. A. Victor Co., 76 Atherton St., 2 story, concrete, steel, Atherton St., to Turner Constr. Co., 178 Tremont St. Est. $50,000.

Mich., Dearborn—PLANT—U. S. Tool & Mfg. Co., Detroit, 1 and 2 story, 100 x 200 ft., steel, Kingsley St., to Austin Co., 16112 Euclid Ave., Cleveland, O.

Mich., Detroit—PLANT—Ex-Cello-O Aircraft & Tool Corp., 5835 Martin Ave., designing constructing 1 story, 53 x 190 ft. new unit, to Austin Co., 16112 Euclid Ave., Cleveland, O. Est. $150,000.

Mass., Dorchester (sta. Boston) — MANUFACTURING—Thompson Wire Co., 43 Mildred Ave., 1 story, basement, cement block, steel, concrete found., Mildred Ave., to Clark & Smith, 13 Temple St., Quincy. Est. $40,000.

Mich., Detroit—COOLING PLANT—Mitchell & Smith, Inc., Copeland St. and Michigan Central R.R., 1 story, 46 x 120 ft., brick, steel cooling plant addition, to Austin Co., 16112 Euclid Ave., Cleveland, O. Est. $40,000.

N. J., Bound Brook—STEEL FABRICATION FACTORY—G. A. Just Co., 395 Lexington Ave., New York, steel fabrication plant, separate contracts. $40,000. **Maturity 1932.** Noted Sept. 4.

N. Y., Astoria—BAKERY—Sussman Bros., 547 Grand Ave., taking bids general contract, 25th Ave. and 45th St. $40,000. J. H. Galloway, Jackson Heights, archt. Noted Sept. 18.

N. Y., Brooklyn—FACTORY—J. Slessinger Co., 545 5th Ave., 2 story, 40 x 90 ft. factory, day labor and separate contracts. $40,000. G. and E. Blum, 415 Lexington Ave., New York, archts. Noted Aug. 21.

N. Y., Buffalo—INDUSTRIAL—Ford Motor Co., 3674 Schaefer Rd., Dearborn, Mich., 1 and 2 story, 400 x 1,000 ft., brick, steel, concrete assembly plant, to Hunkin-Conkey Constr. Co., Newman-Stern Bldg., Cleveland, O. Est. $750,000. Noted July 31.

N. Y., Pleasantville—LAUNDRY—Pleasantville Ideal Laundry Co., 1 story, brick, steel, to Austin Co., 16112 Euclid Ave., Cleveland, O. Est. $75,000.

O., Wickliffe—FACTORY—Cleveland Crane & Eng. Co., H. Karr, purch. agt., 1 story, brick

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Factories and Mills (Continued)

addition, to Austin Co., 16112 Euclid Ave., Cleveland. Est. $40,000.

Pa., Oil City—DUBBS CRACKING PLANT—Pennzoil Oil Co., steel plant, to A. G. McKee Co., 2422 Euclid Ave., Cleveland, O. Est. $500,000.

Pa., Phila.—MANUFACTURING PLANT—R. Goldstein, Water and Wolf Sts., 3 story, basement, 120 x 305 ft., brick, steel, plain found., Porter and Swanson Sts., to Potash Bros., Water and Wolf Sts. Est. $250,000.

Tex., Laredo — HAT FACTORY — Texas Harvest Hat Co., c/o M. D. Llano, pres., 2 story, 75 x 125 ft., brick, rein.-con., plain found., to Ortiz Bros., Laredo, $30,000.

Tex., Luling — REFINERY — Magnolia Petroleum Co., Luling, and 1009 Fannin St., Houston, enlarging refining plant, by day labor. $110,000. Private plans.

Wis., Carrollville—FACTORY—Newport Co., general contract 4 story, basement, 140 x 220 ft., brick, steel, concrete, to P. Riesens Sons, 1022 Humboldt Ave., Milwaukee; structural steel, to Wisconsin Bridge & Iron Co., 1018 Humboldt St.; elevators, to A. Kieckhefer Co., 1032 St. Paul St., Milwaukee. Noted Sept. 18.

Ont., Toronto—PRINTING PLANT—Noble Scott Ltd., 102 Adelaide St. W., general contract 2 story, basement, brick, concrete found., to J. Gordon, 885 Broadview Ave. Est. $100,000. Noted Feb. 20.

Ont., Toronto—STONE PLANT—G. Oakley & Son Ltd., 278 Booth Ave., general contract 1 story, steel, brick, concrete found., to P. Lyall & Sons Constr. Co. Ltd., foot Bay St., $50,000.

GARAGES

PROPOSED WORK

Mass., Fall River—Pocasset Realty Corp., E. Hurst, c/o Pocasset Mfg. Co., revised plans by E. M. Corbett, 49 Purchase St., 2 story, brick, concrete, steel service garage, stores, C St. $40,000 or more.

Mass., Whitman—F. J. Carey, 55 George St., rebuilding 1 story, brick, steel bus garage, George St., recently destroyed by fire. $60,000. Architect not selected.

Mo., St. Louis—Phillips Petroleum Co., 6291 Suburban Ave., several rein.-con., brick gasoline and oil service stations here and in St. Louis Co. $3,000,000.

N. Y., Brooklyn—M. Altman, 350 Stone Ave., 88 x 402 ft., brick service garage, Elton St. and New Lots Ave. $65,000. **Maturity in spring.** Kavy & Kavovitt, 350 Stone Ave., archts. Noted July 25, 1929.

N. Y., Brooklyn—Central Concrete Mixing Co., A. Clarke, pres., 572 Smith St., service garage, King and Dwight Sts. To exceed $40,000. P. Freshman, 50 Court St., archt. **Maturity about January.** Noted Sept. 11.

N. Y., Brooklyn—O. Curth, Saratoga Ave. and Macon St., altering 2 story service garage, Saratoga Ave. and Macon St. $40,000. Allmendinger & Schlendorf, 1 Hansen Pl., archt. **Maturity after Jan. 1.** Noted Sept. 11.

N. Y., Brooklyn — Fulton-Criterion Co., 2 story service garage, Fulton St. and Grand Ave. $75,000. **Maturity in January.** H. M. Sushan, 367 Fulton St., archt. Noted Jan. 20.

N. Y., Brooklyn — H. F. McLaughlin, 153 West 97th St., New York, bids in December, general and separate contracts service garage, Columbia and Creamer Sts. $60,000. J. F. McKenna, 58 Van Dyke St., archt. Noted June 12.

N. Y., Brooklyn—Nicholas Mastranda, 363 East 29th St., sketches by Lama & Proskauer, 391 Fulton St., 100 x 110 ft. service garage, East 29th St. and Avenue D. To exceed $40,000.

N. Y., Brooklyn—J. Sholnik, 729 Avenue T, sketches by H. J. Nurick, 44 Court St., service garage, Adelphi St. and Atlantic Ave. $45,000.

N. Y., Long Island City — Warner Quinlan Co., 2 Park Ave., New York, bids in December, general contract service garage, Vernon Ave. and 13th St. $180,000. Noted Sept. 26.

N. Y., New York—Consolidated Gas Co., 4 Irving Pl., will award general contract in October, 1 story, 62 x 201 ft. service garage, 415 East 110th St. $75,000. Private plans.

N. Y., New York—J. A. Kennedy Realty Co., 381 South St., soon lets general and separate contracts service garage, 575 Water St. $40,000. A. Fisher, 1476 Bway., archt. Noted June 12.

N. Y., New York—Regina Lowenthal, 1880 Grand Concourse, bids early in spring, general and separate contracts 50 x 190 ft. service garage and stores, Bailey Ave. and 230th St. $150,000. A. Slavin, 2690 University Ave., archt. $150,000.

N. Y., New York—M. M. Luedke, Hawthorne, service garage, 65 West 99th St., $70,000. **Maturity in Spring.** C. Schaefer, 332 East 149th St., archt. Noted Sept. 25.

N. Y., New York—H. Mandel Development Corp., 10 East 40th St., 8 story, 99 x 125 ft. service garage, 416 West 25th St. To exceed $150,000.

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N. Y., Richmond Hill—Warner Quinlan Co., 2 Park Ave., New York, soon takes bids general contract 2 story service garage, Vernon Ave. and 44th Rd. $45,000. Private plans.

N. Y., White Plains—Jasamore Realty Co., S. M. Salke, pres., c/o Ellis & Ellis, White plains, 3 story, 50 x 175 ft. service garage, 85 South Lexington Ave. To exceed $100,000.

BIDS ASKED

Calif., Los Angeles—Goodyear Tire & Rubber Co., 6701 South Central Ave., taking bids 2 story, 64 x 122 ft. and 40 x 50 ft., irregular sized, rein.-con., steel sash, ornamental iron, 1401-03 East 9th St. $40,000. C. Beelman, 1019 Union Bank Bldg., engr.

Mass., South Boston (sta. Boston) — Greyhound Garage, c/o Eisenberg & Feer, archts., 11 Beacon St., Boston, taking bids 1 story, concrete, steel service and repair garage, plain found., 571-583 1st St. $40,000.

N. Y., Jamaica—See "Contracts Awarded."

N. Y., New York—M. Michaelson, 539 West 47th St., taking bids general contract altering stable into service garage, 406 West 45th St. $60,000. L. Rogel, 367 Fulton St., Brooklyn, archt. Noted Apr. 3 Daily.

N. Y., New York—Gerosa Paladino Holding Corp. bids about Nov. 1, general and separate contracts service garage, Webster Ave. and 182nd St. $75,000. DeRosa & Cavaliere, 370 East 149th St., archts. Noted May 8.

CONTRACTS AWARDED

Ind., Hammond—Cities Serv. Oil Co., 3200 South Western Ave., Chicago, Ill., two brick, steel super service stations, one at 670 Calumet Ave., to F. C. Rowley, 611 Holman Ave., Hammond, other at 1048 Holman Ave., to J. W. Reed & Son, 284 Standard Ave. Est. $40,000.

Ind., Indianapolis—C. F. Gregg, Market and West Sts., general contract brick, steel super service station, Market and West Sts., to Krebay Constr. Co., 108 East Pratt St. Est. $40,000.

Ind., Ft. Wayne—A. M. Zuber, 2801 New Haven St., brick, steel, hollow tile super service station. $40,000. Owner builds.

Mass., Quincy — Eastern Mass. Street Ry. Co., 38 Chauncy St., Boston, reconstructing brick, concrete garage, concrete found., 954 Hancock St., to Olson & Appleby, 6 South 2nd St., New Bedford. Est. $40,000 or more.

N. Y., Jamaica—Corporation, c/o A. McLean, archt., 149-27 Jamaica Ave., 117 x 107 ft. service garage, Jamaica Ave. and Bellaire St., separate contracts. $40,000.

SHOPS AND FOUNDRIES

PROPOSED WORK

Conn., Meriden — INDUSTRIAL SHOP — State, Industrial School, R. L. McLaughlin, supt., brick industrial school work shop for boys. $45,000. Architect not selected.

Pa., Oil City—FOUNDRY—National Transit Co., F. D. Williams, pres., Seneca and Central Sts., soon lets contract 2 story, irregular sized, steel, brick. H. Stormer, Seneca and Center Sts., engr.

BIDS ASKED

Mass., Springfield—SERVICE SHOP, etc.—Oct. 16, by City, Street Dpt., City Hall, 2 story, basement, brick, steel service shop, and storage unit for city work, Taylor St. $50,000. McClintock & Craig, 458 Bridge St., archts. Noted Aug. 21.

CONTRACTS AWARDED

Ala., Birmingham — FOUNDRY and MACHINE SHOP—Crane Co., 2 South 20th St., 2 story, 140 x 200 ft., steel foundry and machine shop with 50 ft. electric crane, to Southern Steel Wks., 908 Lucien Ave., $100,000.

Ind., Fort Wayne—SERVICE and MACHINE SHOP—A. Tilden, steel, Woodland and Calhoun Sts. $40,000. Owner builds. Larimore & Parkinson, Fort Wayne, archts.

N. Y., Brooklyn—SHOP, etc.—M. H. Renken Dairy Co., 584 Myrtle Ave., altering shop and garage, to W. E. Anderson, 885 Flatbush Ave. Est. $40,000. Noted Sept. 11.

POWER PLANTS

PROPOSED WORK

Arizona—Electric Bond & Share Co., 2 Rector St., New York, preliminary surveys 150,000 hp. power development units on Salt River, above Roosevelt Dam. $3,000,000. C. L. Ager, c/o owner, hydro-electric engr.

N. Y., Flushing—Queensboro Hill Community Church Reformed, R. Anderson, in charge, bids about November on revised plans 1½ story, 38 x 55 ft. boiler room and coal storage, 138th St. and 60th Ave. $45,000. W. B. Willis, 171 Madison Ave., New York, archt. Noted Sept. 18.

BIDS ASKED

Me., Waterville—See "Contracts Awarded."

O., Berea—City, T. R. Barnum, pres. Bd. P. Affairs, in market 1,000 kw. generator to increase capacity electric light plant.

CONTRACTS AWARDED

Kan., Kansas City—City Clerk, power plant improvements, incl. evaporators, to Foster-Wheeler Corp., Dwight Bldg., Kansas City, Mo., $17,160; superheaters, to Schutte-Koerling Co., Dwight Bldg., Kansas City, Mo., $8,271; heaters, to Cochrane Corp., 17 bl. Allegheny Ave., Phila., Pa., $10,100. Grand total $35,531. Noted Aug. 7.

Me., Waterville — Hollingsworth & Whitney Co., Gardner, 1 story, steel, brick boiler house, concrete found., day labor. $40,000. C. T. Main, Inc., 201 Devonshire St., Boston, Mass., engrs.

Mass., Boston—Edison Electric Illuminating Co., 39 Boylston St., altering 6 story, brick power plant, 41 Arch St., to Babcock-Davis Corp., 474 Dorchester Ave., South Boston. Est. $40,000 or more.

Mass., Fall River—Fall River Electric Light Co., R. F. Whitney, mgr., 1 story, brick, steel sub-power station, plain found., Dwelly and Fenner Sts., to New England Power Constr. Co., 89 Broad St., Boston. Est. $40,000 or more.

N. J., Skillman—Dpt. Institutions & Agencies, State Office Bldg., Trenton, general contract 2 story, basement, 35 x 90 ft., brick, steel power house, at State Village for Epileptics, to General Contg. & Constr. Co., 133 East Front St., Trenton, $85,715. Noted Aug. 14.

N. Y., Brooklyn—Brooklyn Edison Co., 380 Pearl St., superheaters for steam generating plant, Hudson Ave., to Superheater Co., 60 East 42nd St., New York, exceeds $250,000.

N. D., Williston — Great Northern Ry. Co., J. R. W. Davis, ch. engr., St. Paul, Minn., foundation and basement for power plant, to C. Stern, Grand Forks. Est. $145,000. Noted June 12.

Pa., Neville Island — E. R. Lee, archt., Chamber of Commerce Bldg., brick refinery boiler house, to Hughes Foulkrod Co., 7th Ave., Pittsburgh, for Gulf Refining Co., Frick Bldg., Pittsburgh. Total est. incl. refinery, $1,500,000. Noted Sept. 25.

WAREHOUSES

PROPOSED WORK

Conn., New Britain—Hardware City Storage Co., 242 Main St., E. W. Schultz, plans by Kingsley Serv. Co., 103 West 125th St., New York, 5 story, 50 x 100 ft., brick, steel, concrete fur storage department, modern facilities, incl. handling equipment, Woodland St. $150,000.

Ind., Evansville—Mead-Johnson Co., plans by F. Fowler, 505 Central Union Bank Bldg., 150 x 550 ft., brick, steel, 9th St. $150,000.

Md., Baltimore—C. H. Osborne, engr., 222 West Franklin St., soon lets contract 6 story, 115 x 125 ft., brick, steel, concrete, Conway St. near Light St., for Tobacco Growers Assn., c/o engineer.

N. Y., Brooklyn—MacAdam & Foster, Inc., 107 Lexington Ave., plans by T. A. Pierce, 419 4th Ave., New York, industrial storage, Lexington and Classon Aves. To exceed $45,000. **Maturity in December.**

N. Y., New York — Spear & Co., 575 6th Ave., 10 story, 100 x 145 ft. warehouse, $500,000. **Maturity in December.** L. Davidson, 104 West 42nd St., archt. Noted Sept. 25.

BIDS ASKED

N. J., Passaic—J. Finkelstein, 165 Lafayette Ave., bids about Oct. 15, revised plans 1 story, basement, brick, steel, rein.-con., plain found., Exchange Pl. $150,000. H. Gerritsen, 118 Passaic Ave., Garfield, archt. Noted Oct. 2.

CONTRACTS AWARDED

N. Y., Brooklyn—P. F. Reilly's Sons, 491 Bergen St., 9 story, 60 x 100 ft. storage, to Wm. Kennedy Constr. Co., 215 Montague St. Est. $150,000. Noted Sept. 18.

N. Y., New York—M. Gassard, 232 East 59th St., storage manufacturing, stores building, 305 East 63rd St., to Magoba Constr. Co., 271 Madison Ave. Est. $500,000. Noted June 12.

N. C., Asheville—Carolina Tobacco Corp., G. Green, pres., 1 story, part basement, 162 x 312 ft., brick, tile warehouse, auditorium, to J. E. Joyner, 538 State St., $60,000.

Pa., Phila. — Wheeling Corrugating Co., Wheeling, W. Va., and 1234 Hamilton St., 1 story, 250 x 265 ft., brick, steel, plain found., to E. R. Hill, 34 North 17th St. Noted Sept. 25.

Tenn., Memphis—Patterson Transfer Co., 24 North 2nd St., R. E. Galloway, pres., 2 story, basement, 100,000 sq.ft. floor space, rein.-con. brokerage warehouse, Georgia and Pennsylvania Sts., to Consolidated Contractors, 119 Madison St. Est. $140,000.

Tenn., Memphis—B. Snowden & C. J. Haase, 2 story, 50 x 175 ft., Pontotoc Ave. and South Front St., t oS. Malkin, 479 North Manassas St. Est. $40,000. Upjohn Chemical Co., lessee.

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